CLINICAL LECTURES

ON

STRICTURE OF THE URETHRA

AND OTHER

DISORDERS OF THE URINARY ORGANS.

BY

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TO

THE STUDENTS,

PAST AND PRESENT,

OF

THE LIVERPOOL ROYAL INFIRMARY,

THESE LECTURES ARE

Dedicated

BY THEIR SINCERE FRIEND,

THE AUTHOR.

PREFACE.

ABSTRACTS of some of these Lectures, and many of the cases referred to in them, have from time to time appeared in the Medical Journals.

I have ventured to compile them in this concise form, for the purpose of expressing my own views, and criticising those of others, upon points of practice which are still open to discussion and consideration. I am indebted to many professional friends for providing me with specimens in illustration, and to Messrs. Longmans for their permission to copy from *Gray's Anatomy*, a plate of the pelvic organs.

I further desire to express my acknowledgments to Mr. F. T. PAUL, for much valuable assistance rendered me, in various ways, more especially in connection with the issuing of this Volume.

38, RODNEY STREET, LIVERPOOL,
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GENTLEMEN,—The practice of this Infirmary affords you abundant opportunities of observing the surgical disorders of the genito-urinary system, and of these, cases of stricture of the urethra, and the complications arising out of it, form no inconsiderable proportion. Associated, as I have been for some years, with two of the hospitals in this town, deriving a large number of their patients from the seafaring population connected with the port, my observation leads me to believe that, amongst this class of the community, stricture is a common disorder. And that it should be so is not surprising. Gonorrhœa, contracted on shore, in the debauch that frequently precedes the vessel's departure for some foreign port, breaks out two or three days afterwards. Treatment, except in the case of certain passenger vessels, is usually conducted by the captain, or his mate, and not always with advantage to the patient. The old notion that every disorder consequent on promiscuous intercourse is "venereal," and must be treated by mercury, still prevails; and large doses of calomel, until profuse salivation is produced,

is not rarely the only remedy administered for a gonorrhœal discharge. Some of the worst cases of stricture that I have seen have been occasioned, under similar circumstances, by resort to the most primitive proceedings for the relief of retention of urine. In the absence of catheters from the ship's medicine-chest, or, still more frequently, as I have found, from their rottenness, I have known instances where the wire from a soda-water bottle, and an iron skewer, have done duty in "forcing" a stricture. It is only a short time ago that a man was admitted into No. 1 ward, with retention and a badly lacerated urethra, as a consequence of an attempt, on the part of the mate of his ship, to reach the bladder by the aid of a pointed piece of wood, roughly modelled to the shape of a bougie. In this instance, the mate was more than professionally interested, inasmuch as he had occasioned the retention by kicking the patient behind the scrotum. The most remarkable piece of ingenuity some of you will remember as occurring a few months ago, where, after a sailor had endured, for over three days, the agonies of retention, an endeavour had been made to introduce through the urethra a piece of lead gas-piping, which had been devised, *in extremis*, for the purpose, by the engineer of the ship. Unfortunately, however, this failed to effect the purpose. When I saw him, on his arrival here, on the fourth day of retention, I found the urethra much lacerated; and it was with considerble difficulty that I introduced a catheter, and removed a large quantity of the most fetid urine imaginable. Relief, however, came too late, the man dying shortly

after his admission, with convulsions and uræmic poisoning.

Though deploring that persons should be placed by circumstances in such unfortunate positions, I mention these cases for the purpose of showing you that your field for observation in this department of surgery is by no means restricted to routine, or even to the freaks of nature, or disease.

In undertaking to say anything about the treatment of stricture, I am conscious that the subject is a well-worn one. Still, with all our plans of treatment, we have not arrived at anything like uniformity of practice; and, as this is only to be obtained by taking the sum of our respective experiences, I feel less hesitation in bringing under your notice some conclusions which my own experience, chiefly gathered in the wards of this hospital, has enabled me to arrive at.* These considerations I hope to place before you during my course of clinical lectures this session.

In using the term "stricture," I reserve it, as Sir Henry Thompson suggests, in his eminently practical work on Diseases of the Urinary Organs, for one kind of stricture, namely, organic stricture. "Spasm" and "inflammation" are conditions more or less transient, but do not constitute stricture in the acceptation of the term which is now generally adopted.

The causes of stricture are various. Let me give

* "Some evidence of the unsatisfactory state of surgery in this respect is to be found, not only in the great variety of plans of treatment which have been proposed and practised, but also in the very great difference of opinion which still prevails among surgeons as to their relative merit."—Savory, *St. Bartholomew's Hospital Reports*, vol. ix.

a few illustrations. A patient has a venereal sore on his glans penis, involving the meatus. When this heals, a cicatrix is left. Cicatrices are, more or less, disposed to contract, and, in this instance, result in the narrowing of the urethral orifice. This condition was well illustrated by a case in No. 7 ward, where the same state of things was produced by an improperly performed operation for circumcision, a portion of the glans penis having been removed along with the prepuce. When the sore healed, the cicatrix contracted, and the patient presented himself here with a tight stricture of the meatus, requiring division.

Another cause of stricture amongst our sailor patients arises from injuries, where the urethra becomes bruised or lacerated. A man falls from aloft, across a spar or a rope, and ruptures his urethra. If the patient recover from the immediate effects of the injury, it is with his urethra scarred. Here we have the worst variety of stricture—traumatic—a form of the disorder more obstinate to deal with than any other.

In our inquiries as to the cause of stricture, we find that by far the larger proportion of our patients attribute their misfortune, directly or indirectly, to previous attacks of gonorrhœa.* Those who do so *directly* are disposed to look upon the stricture as the natural consequence of their previous mishap. Those who do so *indirectly* usually have something to say about the treatment employed, and its bearing upon

* Out of six hundred and forty-six cases of stricture, collected by Mr. Bryant in his own practice, chronic gonorrhœal inflammation had previously existed in two hundred and seventy-three instances.—*Bryant's Surgery.*

the subsequent formation of a stricture. It is worth our while, for a moment, to analyse the statements made by this latter class, with the view of ascertaining how far their allegations hold good. "I was almost cured of my gonorrhœa, only a very slight discharge remaining, which I thought would go away of itself," is the statement of the patient who is convicted of his own indiscretion in having allowed things to go on from bad to worse. Others, again, seek refuge in referring their misfortune to the improper advice they have received. "I was told that it was only a gleet, due to weakness, which would go away by iron, tonics, and cold baths." Here we have illustrations of gleet terminating in stricture.

Now, it is well for you, once for all, to understand that a gleet is not a disorder which is disposed to go away of itself; on the contrary, it requires careful and well-considered treatment; and if it does not receive this—that is to say, if it is clumsily dealt with, or not dealt with at all—it most probably ends in the formation of a stricture.

A gleet is to be regarded as indicative of the early formation of stricture. Nay, further, you will not do wrongly in regarding a gleet as the stage in the stricture-forming process when, by your treatment, you can promise your patient to restore his urethra to its normal condition. When a stricture is once allowed to become cicatricial in its character, you may palliate or adapt, but you can no more *restore* his urethra, than you can, by dissection or any other process, remove a scar from his skin. You may moderate the incon-

veniences of a scar, but you cannot obliterate it. Let not, then, the curable stage of stricture pass by; at all events, let the onus of doing so rest with your patient, and not with yourself.

Again, it is very common to hear patients attribute their strictures to the use of injections in the treatment of their gonorrhœas. A considerable amount of prejudice exists in the public mind in reference to the use of these applications. Patients not unfrequently say, when consulting you about a gonorrhœa, "Do not order me an injection, as I understand they often occasion stricture." Is there any truth in such an allegation? Assuredly not, presuming, of course, injections are judiciously prescribed and properly used.

Let me remind you that the cure of gonorrhœa by specifics is essentially one on the principle of injection. For how do the drugs that act specifically on the urethra effect their purpose? How do we explain the action of copaiba, oil of sandal-wood, creasote, and certain terebinthinates, in the cure of gonorrhœa? Do not all these drugs exercise their therapeutic properties, by certain of their constituents, for the most part demonstrable, being conveyed by the urine to the situation of the disorder? What is this but a cure by injection, or, to be etymologically correct, ejection? It is the urine of the patient that conveys the specific to the disease, just as the rose-water in your injection does the sulphate of zinc, or other astringent.*

* Somewhat similar results appear to follow inhalation. Taking the idea from Professor Dittel's Paper on the benefit obtained in cases of pyelitis and

It is the abuse of injecting that is open to animadversion. Injections, in the treatment of gonorrhœa, only do harm when, by reason of their composition or strength, they act as *irritants* to the mucous membrane.

In the ordering of urethral injections, there are two rules which should be regarded:—1. Do not strain the urethra by the *quantity* of injection used. 2. Do not pain the urethra by the *quality* of the injection. A teaspoonful of fluid *put* into the urethra frequently is better than a tablespoonful *forced* in three times a day. This is a point upon which I have long insisted. In prescribing injections, you should feel your way, adding to the strength according to circumstances. Some persons, it is well known, are far more sensitive to the action of remedies than others; and this applies equally to the urethra —"The temper of the urethra varies as much as the temper of the mind."* An injection appropriate in strength to a first gonorrhœa, is like the proverbial drop of rain on a duck's back in the case of the *habitué*. I remember ordering one of the latter an injection, well known as "the four sulphates." It cured him effectually, and without pain. A friend, hearing of the success, borrowed the prescription, and, without

catarrh of the kidney tubes by inhaling certain essential oils, Zeissl tried it in purulent urethritis. The case selected was a male with a copious discharge, and he was caused to inhale the vapour of rectified oil of turpentine, morning and evening, for a quarter of an hour at a time. On the second day, the urine betrayed the odour which is likened to the smell of violets, and is usual in that secreted by patients taking the oleo-resins. The inhalations caused no inconvenience, and were steadily continued for twenty-five days, at the end of which time the pus had entirely disappeared from the urine. The experiment was repeated in a second case, with like results.—*London Medical Record*, vol. i., p. 361.

* *Brodie, on Diseases of the Urinary Organs*, p. 50.

proper advice, used it. The consequences were, an acute attack of cystitis, and a subsequent stricture. Surely, it is only to the foolhardiness of the sufferer that such an unfortunate result is to be attributed.

And I would here remark that I have seen a great deal of damage done, and suffering occasioned, by the use of some of the nostrum injections advertised throughout the country as "infallible cures" and "preventives." Many of them contain the ordinary astringents applicable to the urethra, but in a very potent form. I caution you, therefore, against sanctioning their use.

These observations have been made with the view of showing that it is only by their improper use that injections are open to the charge of occasioning stricture. If they are prescribed in accordance with the rules I have given, you will never have cause to regret their use.

There are other causes of stricture than those I have illustrated. These, however, are fully treated of in surgical text-books, and do not require mention here.

Excepting the prostatic portion (which has its own peculiar obstruction), any part of the urethra may be strictured.

The greater proportion of strictures occur at the sub-pubic curvature of the urethra, where, for their detection and treatment, we are dependent upon various kinds of instruments known as bougies; consequently it is of the first importance that we should accustom ourselves to the use of these instruments, in order that we may diagnose correctly, and treat skilfully.

It will be proper, here, to remind you that, for the exploration of the urethra, a special speculum, or, as it is called, an endoscope, has been devised. The most improved instrument is Desormeaux's, as modified by Dr. Cruise, of Dublin, where a strong artificial light is reflected along a urethral speculum. A tolerably extended use of this instrument convinces me that its application is limited to certain cases of granular urethritis, which resist the ordinary methods of applying topical agents. In the diagnosis and treatment of stricture, it furnishes little or no assistance.

Less frequently, we find strictures occurring at the meatus of the urethra, and within two-and-a-half inches of it. These strictures are not unfrequently occasioned by the puckering resulting from venereal sores. Most of you will remember the very marked illustration of this variety which we had recently in No. 6 ward, where the last inch of the urethra was strictured by a mass of cicatricial material, which had resulted from the healing of an extensive phagadænic sore.

Before concluding this lecture, I should like to make a few observations on the nature of some of the strictures that we have to treat.

By the traumatic stricture, we understand that which is occasioned by violence, involving the urethra. The violence may be from within, as when a fractured pubic bone pierces the urethra; or from without, as by blows or falls on the perinæum. Here we have, for the most part, jagged and uneven wounds, not rarely complicated with extravasation of urine, a condition of

parts unfavourable to accurate or kindly repair. Injuries occasioned in this way are invariably followed by a dense stricture, and, in this respect, are a contrast to the clean-cut wounds of lithotomy, where the occurrence of stricture is exceedingly rare. This observation has an important practical bearing, and will again be alluded to in considering the treatment of injuries to the urethra.

Two other forms of stricture remain to be noticed, viz., the mucous and sub-mucous. They often co-exist.

By the mucous stricture we understand that the impediment is limited to the lining membrane of the urethra. These, for the most part, consist of the puckerings caused by the healing of ulcers, — the caruncles of the old writers,—and adhesions of the membrane forming those obstacles, which have received the names of valves or of bridles.

In the sub-mucous variety, the obstruction is in the tissues outside the mucous membrane. So structurally unimplicated may this membrane be, that, on its removal from the indurated tissue beneath it, it is found unaltered in its dimensions. This I have verified after death, by dissection. During life, this position of the stricture explains the great success that follows Holt's operation, in certain cases, the effect of such an operation being to break up the stricture without any further damage to the mucous membrane than that of stretching it to its original dimensions.*

* Benjamin Bell, in his work on gonorrhœa, published in 1793, recognised the distinction. "In the more fixed kinds of obstruction proceeding from

The following classification of strictures (after Dittel)* may be found useful for reference. In this are included strictures due to new growth, excluding heteroplastic growths, such as malignant and other tumours pressing upon the canal, the new growths being connective tissue, which always has a tendency to contract when not adequately resisted.

First.—Free (inside the canal), including warts, valves, and bridles.

Second.—In the walls, including traumatic and ulcer cicatrices.

Third.—Outside and around the mucous membrane, including peri-urethral callous, as—

Ring stricture (short).
Nodular stricture.
Diffuse stricture.

It not unfrequently happens that the urethra is strictured at more than one point. Hunter gives an instance where a urethra contained six strictures; and even more than these have been found by Lallemand and other French writers. You will, however, seldom meet with instances where the number of strictures exceeds three; two are not uncommon. Where there are multiple strictures, and the anterior one is exceedingly tight, the difficulty of passing those beyond is much increased, inasmuch as the free

gonorrhœa, the diameter of the urethra is lessened in two different ways. For the most part, it is dimished by a thickening taking place at some particular point in the membrane of the passage itself....At other times, the urethra is drawn together, or contracted as if a cord were tied round it, without any disease being perceptible."

* *Die Stricturen der Harnrohre*, von Professor Dr. Leopold Dittel.

manipulation of the bougie is interfered with by the tightness with which it is grasped by the anterior obstruction. In such instances, it is often necessary to deal with the anterior stricture independently, either by dilatation or incision, until it is sufficiently relaxed to allow of the instrument being passed with freedom on to the face of the deeper obstruction. You have had several illustrations lately of the advantages to be derived in multiple stricture from this plan of proceeding.

SECOND LECTURE.

THE SURGICAL ANATOMY OF THE URETHRA — SPASM — THE DIMENSIONS OF THE URETHRA — OTIS'S VIEWS — THE CURVATURE OF THE URETHRA — THE RELATION OF THE URETHRA TO THE RECTUM — ATTACHMENTS OF FASCIÆ — OPENING OF THE SEMINAL DUCTS.

I SHALL ask your attention on this occasion to certain points relating to the structure, dimensions, and anatomical relations of the urethra. Some persons, it would appear, seem to think that anatomical knowledge is but of little help in this department of surgery. Now, I dare say, many of you learnt to pass a catheter with tolerable dexterity before you knew anything from dissection of the anatomy of the parts operated upon; and so, perhaps, you might continue to do, but the occasion will come when you will find yourself entirely at a loss, and unable to give your patient that assistance which you might otherwise have done.

I could give you numerous illustrations in point, but this is unnecessary, as I take it to be the duty of every person who intends to practise surgery to make himself acquainted with the anatomy of the human body, without excepting any portion of it.

Nor is it my intention to give you an anatomical

description of the urethra; I shall presume that you have acquired this, or, if you have not, I shall refer you to the various anatomical treatises on the subject.

My object here is to point out in what directions your anatomical knowledge may be of service to you, and where you may expect to derive assistance from it in the practice of surgery as applied to diseases of the urethra.

The urethra is made up of various structures, possessing different properties, arranged in layers, viz., internally mucous membrane, then involuntary muscular fibre, disposed longitudinally and circularly, and lastly, erectile tissue, which everywhere surrounds it. Further than this, it must be remembered that in its deeper portion the urethra is embedded in voluntary muscular fibres, which are capable of exercising a compressing force upon its walls, sufficient under the excitement of various stimuli, at all events, to prevent the expulsion of urine from the bladder. Such an impediment is known as spasmodic stricture. Uncomplicated with organic stricture, it is exceedingly rare. It is usually provoked by some active inflammation of the urethra, such as a gonorrhœa, or by the irritating influence of disordered urine; but when uncomplicated with organic stricture, it can never be regarded as affording a serious obstacle to the passage of an instrument into the bladder. When it exists, it is best combated by rest, warmth, and opiates, and such measures as are calculated to remove muscular rigidity.

In one instance that has come under my notice,

the rigidity of the muscles of the perinæum was so unusually great, and the distress on proceeding to pass a catheter so extreme, that I deemed it desirable to place the patient under chloroform. When this was done, a full-sized catheter passed readily into the bladder. On several subsequent occasions a similar course has been followed.

In reference to the muscular surroundings of the urethra, it should be remembered that it is the occurrence of spasm which determines retention. There can be no such thing as an impermeable urethra. So long as the kidneys go on excreting urine, so long, unless a disturbance of muscular action takes place, will urine continue to find its way through the most contracted urethra.

Every person who suffers from stricture finds out from experience the maximum quantity of urine over which he can successfully exercise propulsive power; and so long as this quantity is not exceeded, the ability to expel urine remains, although the stream may be exceedingly small, or even issue in drops. Should, however, from any cause, urine be allowed to collect in the bladder beyond the accustomed limit, the propulsive apparatus becomes disarranged by being called upon to do unaccustomed work, and irregular spasmodic efforts take the place of that combined muscular action necessary in the case of a person who at the best of times voids his urine under difficulties.*

* "How frequently we see a spasmodic condition of the urethra supervening upon old organic stricture, and causing retention of urine. No doubt it

This consideration is offered as explaining how retention may be regarded as an accident occurring in the course of a stricture case, and how it is spasm becomes superadded to permanent urethral obstruction.

The mucous lining of the urethra has depressions in it which in the natural state cannot be regarded as affording any serious obstacle to the passage of one of the larger sized catheters. In cases of stricture, these lacunæ, behind the obstruction, become largely dilated, and are apt then to catch the end of the instrument after it has been passed through the stricture. Again, these dilated lacunæ may afford receptacles for urine, which, becoming decomposed, sets up inflammation within and around the urethra.

The erectile tissue, which everywhere surrounds the urethra, is not unfrequently the source of the hæmorrhage which follows where false passages have been made. The hæmorrhage under these circumstances rarely proves very considerable or persistent.

In his work on Stricture,* Sir Henry Thompson furnishes us with the dimensions of the urethra taken by measurement at its various parts, from which it appears that the meatus is the smallest portion; "next is the point of junction between the membranous

depends upon irritation, beginning with the urethra behind the stricture, which exerts its influence, first upon the nerves of sensation, and thence upon the muscles of the urethra, through the excito-motor function of the spinal marrow. Large doses of opium relax this muscular spasm, and the patient is able to micturate."—Hilton, *On the Therapeutic Influence of Rest*, p. 250.

* Page 6.

portion and the bulb, while the centre of the prostatic portion and the sinus of the bulb are the largest." The respective dimensions of the urethra are best understood by reference to casts, such as are pictured in Sir Everard Home's work on Stricture (Fig. 2).

Fig. 2.

After all, as Sir Henry Thompson goes on to state, "it is not the *actual* size of the various parts of the passage which is of the greatest consequence to the practical surgeon, and the foregoing measurements may be most advantageously viewed as possessing relative rather than absolute value."

Dr. F. N. Otis, of New York, in a recent work on the treatment of stricture, advances the proposition that every urethra is an *individuality*,

and that no *average standard* is of use in examining a given urethra. This he arrives at by the use of a very ingenious instrument, called a urethrametre, consisting of a straight tube, the end of which can be made into a kind of fenestrated sphere, the latter corresponding to a dial-plate at the handle, which marks the size of the sphere. By this means, the normal calibre of the urethra can be accurately measured, as also the circumference of the stricture.*

To give an example, when the circumference of the penis was three inches, the calibre of the canal was found to be 30 m. of the French scale; when it was 3¼ inches, it would be 32 m., and so on in proportion.

Upon these views as to the measurement of the urethra, Dr. Otis bases a method of treatment which will be referred to again when I come to treat of the various plans of practising urethrotomy.

If we refer to a side view of the pelvic organs, we can advantageously study the relations of the urethra to the surrounding parts (Fig. 3, from *Gray's Anatomy*.)

The curves of the urethra should here be noticed, with the view of determining the best position of the parts for the introduction of instruments along the canal.

If the operator were to attempt to pass a catheter with the penis in a pendant position, it is quite evident that he would have to encounter two curves, a difficulty which in the case of a rigid instrument would be found insurmountable; whilst, on the other

* *British Medical Journal*, Feb. 26th, 1876.

hand, the position of the penis may be so varied during the operation as entirely to do away with one

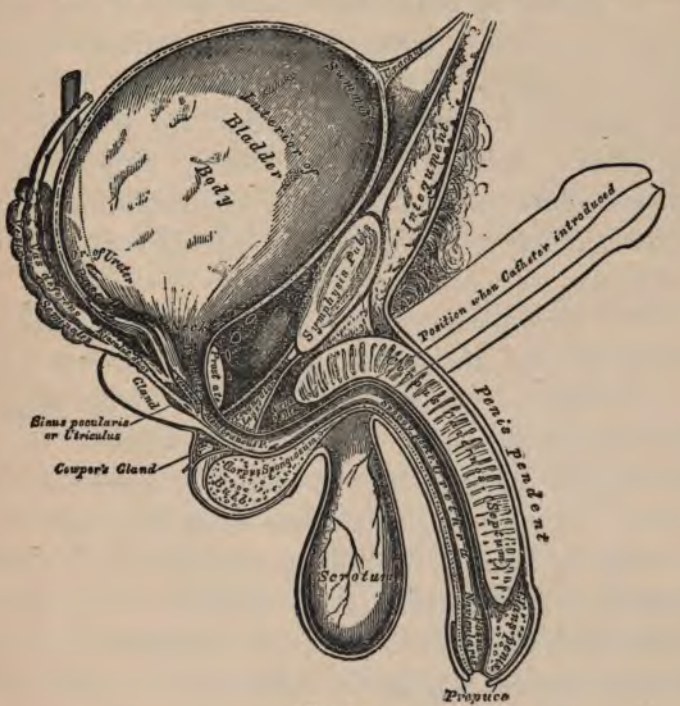


Fig. 3.

curve, and materially diminish the resistance of the other.

It may be here observed that the urethra is only rigidly fixed at one part of its course, viz., as it passes through the triangular ligament. In front of this, it is sufficiently moveable to permit of the whole of the canal being brought upon the same plane as the membranous portion which is contained between the two layers of the triangular ligament. Hence a straight instrument, such as the staff used by Key for litho-

tomy, may be introduced into the bladder quite as readily as an ordinary curved catheter.

It should be remembered that it is at the point where the urethra passes through the triangular ligament the inexperienced operator meets with his greatest difficulty in passing a catheter, the point of the instrument being usually allowed to drop so as to press against the ligament *below* the urethral aperture. After noticing its curvatures, we should next trace the urethra in its course to the bladder.

The first portion of the passage is subcutaneous, being situated along the under surface of the penis. Here it can be manipulated externally by the fingers, and direct assistance in this way rendered in the piloting of bougies through tight or tortuous strictures. In the case of strictures in this portion, their division by external or internal urethrotomy is accomplished without difficulty, by reason of the facility with which the urethra can here be handled. As the urethra passes behind the scrotum, it consequently becomes more deeply situated, and less accessible to external manipulation; whilst further again, in the perinæum, and behind the triangular ligament, little impression can be made upon it from without.

If, however, you will refer again to the side view of the urethra, you will see that even here it is not beyond the reach and control of the finger.

On introducing a bougie into the bladder, and the index finger into the rectum, the line of the urethra for an inch and a half of its course can be distinctly made out, and the position of the instrument deter-

mined. Now, when we consider that the great majority of strictures are situated in this portion of the urethra, this is a piece of anatomical knowledge worth remembering. Fewer false passages would be made in difficult cases of catheterism if we bore in mind that we had the means of testing in the deep portion of the urethra the course the instrument was taking, and of rendering assistance to the passage of the instrument through the stricture, by the introduction of the finger into the rectum.

To proceed. If the finger is carried still further, the line of the prostate can be distinctly made out, and any alteration in its size or consistence noted.

In difficult catheterism arising from prostatic enlargement, assistance may often be rendered in "tilting" the instrument into the bladder by the finger in the rectum. Further than this, where, by reason of the enlargement of the middle lobe, there is much resistance to the entrance of the catheter into the bladder, by placing the finger as a support to the prostate, that concussion or shaking of the gland is prevented which in two instances that came under my notice led to the occurrence of fatal pelvic cellulitis.

A reference to Figure 3 also shows that in retention of urine the posterior wall of the bladder can be explored and commanded sufficiently to admit of its being punctured without injury to the surrounding parts. In children, not only can a stone in the bladder be felt by the finger in the rectum, but, as Mr. Thomas Smith has pointed out, its removal facilitated.

Turning to the anterior aspect of the bladder, we should observe that the peritoneum, in its reflection from the back of the abdominal muscles on to the bladder, leaves a space just above the symphysis pubis, where the bladder, when it is distended, may be punctured without injury to the peritoneum.

We should now proceed to notice the attachments and connections of the various fasciæ having relation with the urethra ; for we shall find that when matter forms around the urethra, or extravasation of urine takes place, the direction taken by these fluids is entirely influenced by the attachments of the fasciæ. If you refer to a side view of the pelvic fasciæ, you

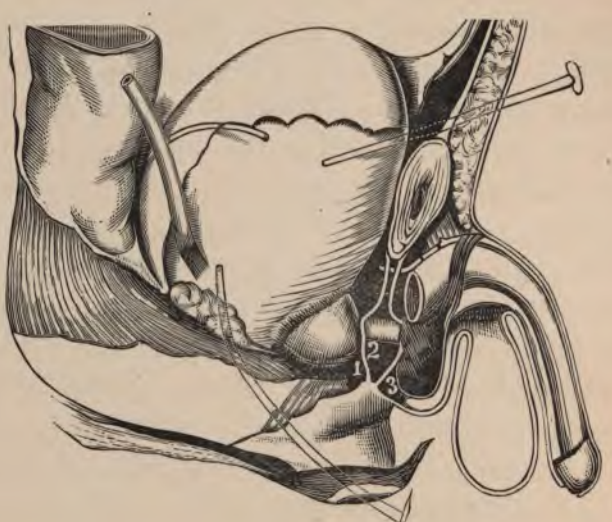


Fig. 4.

will see that there are three distinct compartments

where, about the perinæum, fluid may collect. In each, the course taken by the fluid—be it urine or matter—will be different, the difference being determined by the connections of the layers of fasciæ between which it is placed. When matter forms around the prostate gland, in the compartment marked 1, it cannot come forwards, in consequence of the triangular ligament; it therefore goes backwards into the cellular tissue of the pelvis, where it will spread with great rapidity and fatality, under the name of pelvic cellulitis. The formation of matter in this position may be occasioned by injuries to the prostatic portion of the urethra. Not unfrequently it is the cause of death in lithotomy, where the incision into the prostate has been so free as to include its fibrous investment. When matter forms in compartment No. 2, between the layers of the triangular ligament, it either bursts into the urethra or makes its way towards the anus. Suppuration in this position not unfrequently takes place, as a consequence of a very acute urethritis, and gives rise to the belief that inflammation of the prostate has occurred. Abscess here often simulates suppuration in the prostate, and is mistaken for it. Retention of urine, from pressure on the urethra, may in this way be caused, and relief is not obtained until either the abscess bursts into the urethra, or is opened by an incision.

When matter forms in compartment 3, that is to say, between the superficial perinæal fascia and the superficial layer of the triangular ligament, fluid is

conducted towards the scrotum, and from thence it may pass to the anterior surface of the abdominal parietes, over a very considerable area. If unrelieved, the damage that is done to the tissues in contact with extravasated urine is immense; large portions of skin and cellular tissue slough and are discharged, and high constitutional symptoms, which tend rapidly to assume a typhoid character, not unfrequently are consequent upon urine retained in this position. Unless relief is speedily afforded by the knife, urine may travel as far as the umbilicus, or even above it, as we have seen on several occasions.

Passing to the interior of the urethra, I would remind you that within it are the openings of the canals conveying the semen, and other fluids which it is supposed are engaged in its elaboration. Hence we may infer that that which is an obstacle to the natural escape of urine is, *pro tanto*, an obstacle to the efficient discharge of the other secretion; and so undoubtedly we find it to be the case, for sterility on the part of the male is constantly met with as one of the consequences of stricture.

There is one very important landmark which must not be passed by unnoticed.

If you expose the perinæum, you will see that it is marked along the median line by a prominent ridge or elevation, called the raphé. This is a guide to us in many operations on this part. Along it the perinæum can be incised for stricture, abscess, or extravasation, to any necessary depth, with no risk of serious hæmorrhage occurring, whilst in the operation of

lateral lithotomy it indicates the position of our first incision.

When the perinæum is tumid from extravasation of urine or suppuration, it not unfrequently happens that the raphé is more or less pushed over to one side or the other, or even slightly curved. The incision to open the perinæum must correspond with such a deflection, otherwise troublesome hæmorrhage is likely to follow.

Such, then, are a few considerations which a knowledge of the anatomy and relations of the urethra suggest. They are sufficient to indicate the necessity of this study as the only proper preliminary to undertaking the management of its disorders.

THIRD LECTURE.

SYMPTOMS OF STRICTURE — GRANULAR URETHRITIS — CONSEQUENCES OF STRICTURE ON THE GENITO-URINARY ORGANS— DISEASE OF THE KIDNEYS—EXAMINATION OF THE URINE.

THE patient's suspicions that he is suffering from stricture are usually first aroused by his noticing some alteration in the force, direction, or size of the stream of urine in the act of micturition.

Unfortunately, however, for him, these indications do not generally become apparent until the disorder has made some considerable progress. It is of the first importance, then, that we should consider what may be regarded as the premonitory stage.

If we analyse the symptoms of stricture, excluding, for obvious reasons, cases of traumatic stricture and such like causes of obstruction, we shall be able to refer them to one or other of two classes, viz., (*a*) symptoms indicating inflammation, and (*b*) symptoms of obstruction.

The symptoms of the first class, namely, those of inflammation, not only precede those of obstruction, but usually extend over a considerable period of time.

Most frequently they are consequent on an acute gonorrhœa, and their extreme slightness, and the little inconvenience they occasion, are apt to render

the patient almost unmindful of their presence. The only outward sign may be a continuous, though slight, muco-purulent discharge. Such a discharge is usually most obvious in the morning, and is often only sufficient to glue together the lips of the urethral orifice.

Further examination proves the existence, in varying degrees, of what are regarded as the cardinal symptoms of inflammation. Should we proceed to examine the urethra of such a patient with a bougie, there is *pain*, and an unpleasant sensation of *heat* as the instrument passes over the seat of the disorder; and that some inflammatory exudation—*swelling*—has taken place is evident by the resistance to the instrument that the operator is conscious of. That there is *redness*, or congestion of the part affected, is proved by endoscopic examination, should this be considered necessary for completing the case. These signs of inflammation,—pain, heat, redness, and swelling,—are usually accompanied by some obvious perversion of function. Not rarely there is frequency in micturition, and painful nocturnal emissions. These symptoms indicate the premonitory stage of stricture. The urethra becomes granular, a condition which has its resemblance in the granular lids of scrofulous children, with which we are so familiar.

The appearance presented by the healthy urethra, as viewed through the endoscope, "resembles very closely, on a smaller scale, a healthy rectum as seen through a speculum; or a vagina, but with the difference that the folds of mucous membrane of the

healthy urethra are longitudinal instead of transverse."*

The granular urethra presents a somewhat blotched appearance, the radiating lines being concealed by points of granulation. The contrast between the healthy and granular urethra is seen in the following sketch (from Heath). Fig. 5. 

The inflammatory or premonitory symptoms, if unchecked, sooner or later give place to those indicating that obstruction has taken place; the stream of urine as it issues is wanting in force, or it is twisted or diminished in size, and as the contraction goes on these inconveniences increase.

In some cases, the symptoms are of an anomalous nature, and have no obvious correspondence with the description I have given. The formation of a hernia, or an enlargement of the testicle, may be the only indication of an urethral obstruction. It is also not uncommon to meet with cases where a sudden retention of urine is the first intimation to the patient that he is suffering from stricture.

It seems very strange that progressive changes in the urethra, such as stricture involves, should go on without the patient being aware of them, until, as it were, a crisis is reached. But so it is. A certain proportion of cases fail in affording a satisfactory explanation, further than to suggest that the patient has been particularly wanting in the commonest observation.

* Heath, *On the Endoscope*, p. 7.

The obstructive material, whilst these symptoms are continuing, gradually alters in its character. At first, it is merely an inflammatory exudation, soft and readily compressible; later on, as it becomes organised, it comes to resemble the tissue of which scars are made up, not only in appearance, but also in its disposition to contract. The degree of resistance that this adventitious tissue is capable of offering is often remarkable, whilst in extent it is in some instances sufficient to convert the whole perinæum and scrotum into an indurated mass.

The worst feature connected with this deposit is its indisposition to become to any extent absorbed. You may exercise pressure upon it, you may divide it with the knife, or act upon it with caustics, but you cannot entirely remove it or deprive it of its inherent quality of contraction.

The treatment of advanced stricture will, therefore, be seen to resolve itself to a great extent in palliating and adapting, and this has been brought to such perfection, that it is remarkable how little distress the patient may be conscious of, provided he exercise a moderate amount of care and precaution in the management of his own case. And, in speaking of treatment, it is well that we should understand our position in reference to the disorder we undertake to treat. Fortunately for mankind, there are many of its ailments which have a natural tendency towards what I may call a spontaneous cure, and even some of the most malignant diseases occasionally undergo changes of a benign character, remain quiescent, and cease to

trouble. It is not so, as a rule, with stricture, unless it is kept in check by appropriate means; it is progressive, and the longer it remains untreated, the more hurtful it becomes.

It will be desirable here to note the remoter changes that take place.

As the contraction increases the urethra behind the stricture becomes dilated, so much so, that in some cases pouches are formed in which urine is apt to collect. In long-standing strictures these dilatations are so well marked as not to disappear after the stricture has been remedied. A gentleman, who some time previously had a tight stricture divided at the orifice of his urethra, consulted me in consequence of the very disagreeable odour of his urine when first passed in the morning. On examining him with a catheter, I found that urine collected in two very considerable pouches in his urethra. I advised him to drain off his urethra every night, just before going to bed, by means of a catheter, slowly introduced and withdrawn. This had the desired effect, and speedily removed the inconvenience he complained of.

These pouch-like dilatations behind the stricture, which not unfrequently extend to the small ducts and lacunæ opening into the canal, are a frequent cause of peri-urethral, or, as it is otherwise called, urinary abscess.

The constant presence of urine in the urethra behind the stricture not only sets up inflammation within the canal, but also around it. Should suppuration occur, unless relief is given externally, the matter will find its

way, by ulceration, into the urethra, and extravasation of urine follows. In the great majority of cases, it is in this way, I believe, that extravasation happens, and not, as we are generally led to suppose, by rupture o the urethra behind the stricture.

It has been proposed to take advantage of the distended condition of the urethra behind the stricture to effect dilatation from behind forwards. In the *British Medical Journal*, of November 9th, 1872, Mr. Furneaux Jordan, of Birmingham, describes, in an interesting paper, this method of treatment, which he has practised with success.

In addition to these changes in and around the urethra, the bladder becomes structurally altered, in consequence of its action and function being disturbed. In one case you will find its walls thickened and its cavity contracted, whilst in another it is expanded, with walls thinner than natural.

In the former it is hypertrophied, for the purpose of overcoming the resistance offered by the stricture to the natural discharge of the urine, just as the heart, by an increase in its bulk, compensates for the resistance that is offered to it by an impeded circulation. Where the bladder is dilated and thinned, it seems to have gradually yielded to an obstacle which has been beyond its power of overcoming. What determines the one or other condition is, I fear, little more than a matter of surmise. Probably the degree of irritability the stricture occasions, or the disposition of the patient, has something to do with it.

It occasionally happens, though rarely, that rupture

of the bladder takes place during the effort of a patient to overcome a stricture. An instance of this occurred in the Infirmary some months ago. Here the patient had been suffering from retention for some days. When admitted into the Infirmary he was in a state of collapse, from which he never rallied, dying eighteen hours afterwards. A catheter was introduced into the bladder without difficulty immediately after his admission, but only a few drops of blood-stained fluid escaped. At the *post mortem* examination, a rupture of the bladder was found in the posterior wall communicating with the cavity of the peritoneum. The edge of the opening was covered with lymph, and the rent measured, when not stretched, one and-a-half inches in length. There were also signs of peritonitis. Though there could be no doubt of the patient having suffered from retention, no sensible diminution of the calibre of the urethra could be discovered, so that we must conclude that the obstacle was occasioned by spasm. The history of the case would admit of no other conclusion. The specimen is preserved in the Museum of the School.

Going still further back, we find the ureters and kidneys yielding to the pressure of the *vis a fronte;* these may, in the course of time, become mere tortuous tubes, and little else than subsidiary bladders, as you may gather from the specimens I am placing before you.

Kidney disease, varying from slight congestion to almost complete disorganisation, is a frequent concomitant of stricture; this is a fact which should never

be lost sight of, and brings me to notice the importance of examining the urine.*

No operation, however slight, can be regarded as absolutely free from danger, and even the passing of a catheter, simple as it seems, forms no exception to this rule. In a very interesting article, to which I shall have occasion again to refer, on Urethral Fever, published in the *Edinburgh Medical Journal*, of June, 1871, my colleague, Mr. Banks, narrates a case, I well remember, where death occurred six-and-a-half hours subsequently to the passage of a bougie. Allusion is also made in the same paper to a case of Mr. Padley's, in the Infirmary, where death followed, under similar circumstances, in the course of a few minutes. These undoubtedly were cases of shock, so severely felt as to be almost immediately fatal, and before the development of those reactionary indications on the system generally which have suggested the term "Urethral Fever."

As no subjects bear shock so badly as those who are suffering from structural kidney disorder, every means should be taken for determining the precise condition of these organs before deciding, in a case of stricture, the line of treatment that is to be pursued,

* "Among the cases of stricture, one hundred deaths occurred (in Guy's Hospital) in nineteen years, giving a yearly average of about 5.26. Of the whole number of cases, the kidneys were suppurating in forty-one of the hundred; they were wasted away or inflamed in eighteen; in seven they showed evidence of the changes included under the term Bright's disease, or were cystic; while, in the remaining thirty-four, they were healthy. Thus fifty-nine, or nearly three-fifths of all the cases, had advanced disease of the kidneys."—J. F. Goodhart, *Guy's Hospital Reports*. Series iii., vol. xix.

and hence a thorough examination of the urine is of the first importance.

The existence of advanced kidney disease will limit us to such proceedings as have for their object the preservation of life, independently of other considerations, "for kidney disease, as a rule, is enough to deter the surgeon from performing any operation other than that to save life; and in such operations it renders the prognosis most unfavourable, since it is well known that the chief cause of death, after operations, is kidney disease, and the worst forms of the disease are undoubtedly directly due to calculous affections, to vesical, and urethral mischief."—Bryant's *Surgery*, p. 488.

It is not necessary for me tell you how to test the urine; this is sufficiently explained in the text-books; albumen, pus, blood, and sugar must all be carefully looked for, whilst the microscope will afford much valuable information, especially in determining the structural condition of the kidneys.

FOURTH LECTURE.

Treatment of Stricture — Gradual Dilatation — Instruments Employed — The Filiform Bougie — Anæsthetics — Continuous Dilatation.

I now come to consider the treatment of stricture, and as dilatation by bougies is the oldest and most extensively employed means, and as all other methods of treatment are more or less subservient to this, it will be proper to give it the first consideration.

Before, however, submitting a case for instrumental treatment, the very important question should be asked, Is the patient in a suitable condition for its advantageous employment? With few exceptions, persons suffering from stricture seek professional assistance at times and under circumstances when they are least fitted to undergo the treatment necessary for their cure.

The patient who sends for you to relieve his retention has, most probably, induced this state by an excess of some sort. The urethra has been rendered irritable by the passage, perhaps, of unhealthy urine, which has provoked sufficient spasm of the urethra to convert impeded micturition into complete retention.

I have frequently pointed out the great advantage following the employment of rest, and such like

measures, in cases coming to the Infirmary for the treatment of retention.

A patient was admitted into the Infirmary the other day for retention, where prolonged efforts had been made, before his admission, to pass a catheter. I saw from his clothing that he had been bleeding profusely. His bladder could be felt distended above the pubes, though not largely so. Under these circumstances, I ordered him a hot bath, and a dose of laudanum, and to be well covered up with hot blankets. By these means he was enabled gradually to empty his bladder. On the third day after his admission, on the first trial, I passed a No. 1 bougie through a tight stricture without drawing a drop of blood. Prolonged catheterism is in itself an evil; every deviation the instrument makes from the course of the urethra occasions a rent, and every rent leaves a scar; so that in this way the original stricture may be considerably added to.*

When circumstances will permit of it, the employment of rest, and attention to the condition of the urine and the general health, not only facilitate the passage of instruments along the urethra, but render their use much more serviceable.

Under ordinary circumstances, I find that the recumbent position is the best for the patient to be placed in for catheterism. He is more at his ease, and

* It is a point that cannot be too strongly insisted upon, that the operation should not cause the urethra to bleed; if any blood escapes through the instrument, or by its side, while it is being passed towards the bladder, it is my invariable rule to desist from the operation for the time."—Callender, *St. Bartholomew's Hospital Reports*. Vol. ix., p. 41.

more complete muscular relaxation is thus obtained. Occasionally it is necessary to place the patient under the influence of an anæsthetic; this cannot safely or conveniently be done in any other than the horizontal position; and, therefore, you should accustom yourself to this, otherwise you may expect to find yourself somewhat awkward in your manipulations.

I need not describe to you how to pass a catheter; observation and a little patience on your part will enable you to overcome those slight impediments which even the normal urethra presents. John Bell, in his *Principles of Surgery*, very aptly remarks, "There is no operation with which I should more earnestly entreat the young surgeon to make himself acquainted than this of introducing the catheter." *Festina lente*—be patient and never resort to force. The most serious hitch that young operators experience in passing catheters, even along normal urethras, is when the point of the instrument reaches what I have called the fixed portion of the canal. On its way through the urethra, anterior to the triangular ligament, it is apt, by gravity, to exercise a greater pressure on the floor than the roof of the urethra, consequently, when it arrives at the fixed point, the instrument is below the level of the aperture in the ligament.

This is shown in Figure 6, from Dittel. If you exercise pressure, the urethra is torn, and blood flows. If you will remember that the hitch is best avoided by keeping along the roof of the urethra, and overcome by elevating or rather drawing up the point of your instrument, difficulty need not be anticipated.

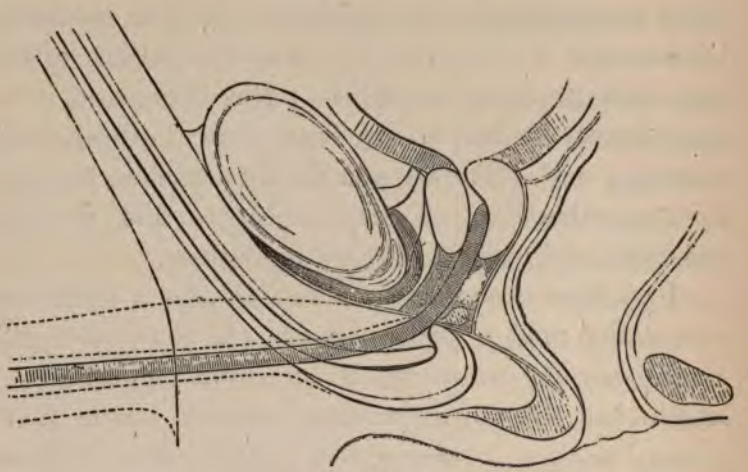


Fig. 6.

There is very considerable variety in the shape and make of urethral bougies and catheters. Some you can shape for yourself according to your fancy, or in reference to the particular case, or even leave it to the urethra to mould; these include the gum-elastic instruments. Others, again, are made of silver, or some light metal, curved in accordance with the fashion prevalent in their day—fashion appearing, to some extent, to influence surgery as well as less important matters. Hence varieties in the curvature of metallic instruments are met with. I prefer the short curves, such as the Edinburgh instruments which are associated with the name of the late Professor Syme. I dislike operating, as one has to do sometimes in cases of emergency, with instruments curved differently to those I am accustomed to; and I would advise you, as far as practicable, to adhere to one form of instrument, if you wish to acquire dexterity in its use.

When a surgeon undertakes the treatment of a presumed case of stricture, it will be necessary for him to *explore* the urethra, and, in doing this, he should endeavour to obtain the greatest amount of information with the least amount of pain and distress to his patient.

It is my belief that the instrument which best enables us to fulfil these conditions is the plain bougie, with the end slightly rounded—not bulbous—to facilitate its introduction. If a surgeon cannot by this obtain all the information he requires about the urethra, I am sure he will not be assisted by any of the bulb or olive-headed instruments which are vaunted for this purpose. It is a matter of touch and of handling—*tactus eruditus*—which require quite as much to be educated and practised to detect fluctuation. To the unpractised hand, the whole length of the urethra is a stricture, which no form of instrument would render otherwise.

For the dilatation of strictures a conical instrument is better, as it does its work on the principle of the wedge; for this purpose you generally see me employ the bougie-à-boule (Figure 7). They are not so relia-

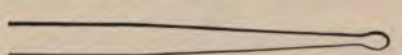


Fig. 7.

ble as the plain instrument for exploring a strictured urethra, but they are preferable as dilators. In selecting them, "preference should be given to such instruments as are rather stiff, but have a long, slender, flexible neck supporting the bulb. When held vertically,

bulb upmost, and touched upon the olivary tip, the neck should yield at once. Such an instrument will guide itself safely, and override obstruction. The olivary points found on the English conical bougie are useless

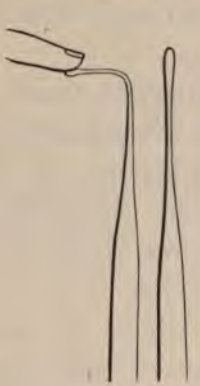


Fig. 8.

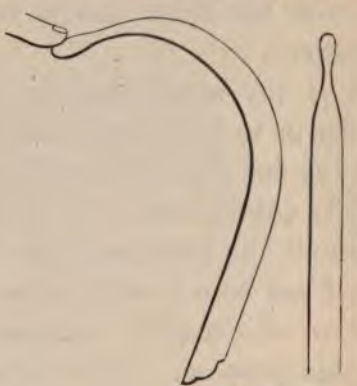


Fig. 9.

as far as any advantage derived from the bulb is concerned, from a neglect to make the neck of the instrument flexible."*

You have also seen me use, with advantage, in tight, tortuous strictures, cone-shaped bougies (Figure 10) without the bulb; these, however, are rather apt

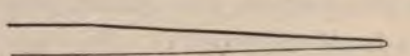


Fig. 10.

to hitch in the lacunæ of the urethra, and, consequently, are not so easily passed as the bulbous-headed instrument.

There is another form of elastic bougie which you will find exceedingly useful in the treatment of tight

* *Genito-Urinary Diseases.* Van Buren and Keyes, p. 107.

stricture; I allude to the filiform bougie. With care and patience they can be insinuated through the finest and most tortuous canal. The direct dilating power you can exercise upon a stricture is certainly not great; indirectly, however, they are of service, and, after one or two trials, increased sizes may be made to follow.

Though, I believe, you will generally find flexible instruments suitable, you will meet with cases where, with all your dexterity and patience, either from the hardness or tenacity of the stricture, or from the existence of a false passage, a flexible instrument will not pass. You will then resort to bougies made of metal. Let me give you one caution in reference to them. The smaller sized instruments, unless used with delicacy, may occasion a very considerable amount of damage, as, by a very little pressure, they may be made to work their way out of the urethra. I showed a specimen, some years ago, at the Medical Society, where, in the hands of an experienced operator, a No. 1 metallic bougie had been made to leave the urethra in front of a hard stricture, and to re-enter it behind the stricture.

The metallic instruments generally in use are of an uniform diameter throughout, the end being slightly rounded to facilitate introduction. There is an extremely useful variety, where the principle of the wedge is introduced. These instruments are made so as gradually to increase in size from the tip to the curve. The four I have in use are so arranged; the first represents on the curve, 1 to 3; the second,

4 to 6; the third, 7 to 9; and the fourth, 10 to 12. It must be remembered that these four instruments represent a very considerable amount of dilating power, and consequently must be used with caution.

With the instruments I have now brought under your notice, provided you will learn how to use them, I do not think you will meet with difficulty, either in detecting strictures or dilating them when necessary.

There are one or two points I should like to remind you of. In the first place, take care that the instrument you use is smooth, warmed, and well lubricated. For the last purpose I employ castor oil in preference to anything else. Being more viscid than other oils, it is not so easily rubbed off by the first portion of the urethra. I first saw it used at St. Bartholomew's Hospital, by the late Mr. Wormald, whose dexterity with the catheter was proverbial.

In the employment of gradual dilatation, avoid inducing anything like extreme tension. There is nothing so repugnant to the tissues as tension, or which they are more apt to resent. I have seen a case of gradual dilatation delayed for several weeks by a neglect of this precaution. In using bougies then, in increasing sizes, stop short of the one you feel sure may be passed, but will be a very tight fit. *Festina lente*—let a few days elapse, and you will find that, on the next occasion, the size which would have required some force now passes readily.*

* "The grand error to be avoided is that of proceeding too hastily, which not only defeats the practitioner in attaining the object he has in view, but exposes the patient to the danger of hæmorrhage, complete retention of urine, swelled testicle, feverish attacks resembling ague,

As a rule, four or five days should elapse between each "sitting."

In the employment of flexible instruments particularly, I should advise you to measure them with a gauge, and to work systematically from this. These instruments often vary, and do not correspond with the numbers marked upon them. I prefer the French gauge, as the increase in size is much more gradual than that adopted in England.

The degree to which dilatation should be practised is a point of much importance. The English make of instruments usually determines No. 12 as the limit. I prefer, as a rule, three or four sizes above this. To avoid the meatus being kept on the stretch the whole time the instrument is being passed, I have my own bougies, above No 10, made to diminish from the curve towards the handle. When we consider that in the employment of gradual dilatation we get little more than the stretching of the urethra, it is a matter of importance to take care that the stricture is sufficiently stretched; and this, in the majority of instances, is not accomplished by the English No. 12 bougie.

When practicable, instruct your patient how to pass a bougie for himself, as all modes of treatment require the occasional use of the instrument; and this, when he is properly educated, may generally be left to the patient, after the urethra has once been sufficiently dilated. In the case of elastic bougies, it is as well to caution the patient against retaining them in their service too

and other unpleasant consequences." — Syme's *Principles of Surgery*, p. 338.

long; they are apt to become brittle, and are then, of course, dangerous.

In patients who are very intolerant of catheterism, or where there is difficulty from spasm, in passing an instrument, an anæsthetic may be administered with advantage. As a rule, for these cases, I prefer chloroform to ether, as, with the latter, the stage of excitement is usually more prolonged, a point worthy of consideration where we have a distended bladder. I mention this, as I prefer, for surgical operations generally, ether to chloroform. In using anæsthetics for this purpose, bear in mind Sir Henry Thompson's observation. "Let it be remembered that chloroform is administered, not for the purpose of permitting the instrument to be used with greater force than before, but in order to produce perfect anæsthesia and relaxation of the muscles."*

And now it will be proper to ask what we may expect from treatment by gradual dilatation. In the earlier forms of stricture, where the obstruction is cellular rather than fibrous, you will find that the introduction of the bougie exercises a healthy stimulus on the part, and leads to the removal of the effusion producing the obstruction.

In advanced stricture, where the adventitious deposit has been allowed to become cicatricial or indurated, I fear your dilatation will do no more than dilate. You can stretch the narrowed urethra to a size corresponding with the natural dimensions of the canal, and, in the great majority of instances, by a

* Thompson, *On Stricture*, p. 178.

moderate amount of care and persistence in treatment, you can keep it so stretched, but I have not been able to infer or to demonstrate that absorption, under these circumstances, actually does take place. What absorption may have been observed to take place is to be attributed to the stimulating effect produced upon the urethra by the passage through it of what can only be regarded as a foreign body. We all know that pressure does produce absorption, but in order that it may so act, it must be continuous, and not interrupted.

I may conclude my remarks upon treatment by gradual dilatation, by observing that it is adapted to all strictures of recent date, and to those more advanced where the process of dilatation is not intolerant to the patient, and where, subsequently, the dilated condition may be sustained with a moderate amount of care.

I will now pass on to notice the treatment of stricture by what is called continuous dilatation, a method which possesses some very decided advantages.

It is based upon the observation that when a bougie is retained within a stricture sufficiently long to set up inflammatory action, the stricture yields, so that, within forty-eight hours or so, a bougie several sizes larger may be readily passed; by the extension of this principle, dilatation, even of the tightest stricture, may be very speedily accomplished. Hence it is well adapted to tight strictures where catheterism is attended with more than ordinary difficulty.

In gradual dilatation, the temporary pressure of the bougie stretches the stricture, and the stretching may, in favourable cases, be carried out to such an

extent as, in a great measure, to deprive the stricture of its contractile power, just as the frequent stretching of an elastic material, such as an india-rubber band, weakens its contractile, or rather recoiling, power.

In continuous dilatation limited inflammation of the urethra is excited, under the influence of which the stricture-material melts down, so as to render the canal readily dilatable.

To carry out this treatment, a gum-elastic catheter is introduced, and retained by some suitable contrivance. A convenient way of keeping a catheter in this position is by a ring passed over the penis and secured to the body, the end of the catheter being attached to the ring. I see, in the *Lancet*, of January 29th, 1876, that Mr. Furneaux Jordan, of Birmingham, prefers a bougie to a catheter for this purpose, the advantages of the former being—"a more rapid and complete dilatation, due to the hydrostatic pressure of the urine along the exterior of the bougie. A bougie is more easily introduced than a catheter. When the finest bougie is once in, it need not be taken out—no slight boon; the ordinary acts of micturition are preserved; every kind of apparatus for keeping the bed dry, or for any other purpose, may be dispensed with."

I have found a fine bougie—for instance, the filiform—answer all the advantages claimed for it by Mr. Jordan.

In some cases of tight stricture, it is found impossible to introduce a flexible instrument. The ordinary metallic catheter answers the purpose

As a rule, four or five days should elapse between each "sitting."

In the employment of flexible instruments particularly, I should advise you to measure them with a gauge, and to work systematically from this. These instruments often vary, and do not correspond with the numbers marked upon them. I prefer the French gauge, as the increase in size is much more gradual than that adopted in England.

The degree to which dilatation should be practised is a point of much importance. The English make of instruments usually determines No. 12 as the limit. I prefer, as a rule, three or four sizes above this. To avoid the meatus being kept on the stretch the whole time the instrument is being passed, I have my own bougies, above No 10, made to diminish from the curve towards the handle. When we consider that in the employment of gradual dilatation we get little more than the stretching of the urethra, it is a matter of importance to take care that the stricture is sufficiently stretched; and this, in the majority of instances, is not accomplished by the English No. 12 bougie.

When practicable, instruct your patient how to pass a bougie for himself, as all modes of treatment require the occasional use of the instrument; and this, when he is properly educated, may generally be left to the patient, after the urethra has once been sufficiently dilated. In the case of elastic bougies, it is as well to caution the patient against retaining them in their service too

and other unpleasant consequences." — Syme's *Principles of Surgery*, p. 338.

tion is obviously promoted; in the later stages, I believe that the stricture is merely stretched to the desired extent.

In continuous dilatation, the action set up in the part certainly promotes absorption.

This treatment, therefore, should be more extensively employed, its results appearing to me to be of a more lasting character than any other I at present know.

FIFTH LECTURE.

URETHRAL FEVER — SUPPRESSION OF URINE — HÆMORRHAGE FROM THE URETHRA — FALSE PASSAGES.

No operation in surgery, however slight or dexterously performed, can be regarded as absolutely free from danger. Nature will, at times, resist interference, however loudly demanded, in a manner little anticipated and even inexplicable. In this "chapter of accidents," I purpose first to draw your attention to certain phenomena occasionally following the passage of instruments along the urethra, to which have been applied the term "Urethral Fever."

It not unfrequently happens, after a bougie has been passed, that the patient experiences a sense of chilliness; this "rigor," as it is technically called, is usually followed by more or less febrile excitement, which subsides without occasioning the patient much distress.

Passing to the opposite end of the scale, we now and then meet with a case, where the most alarming symptoms of shock are speedily followed by death.

I very well remember, as I happened to have charge of the ward at the time, the fatal case alluded to in Mr. Banks' excellent pamphlet on Urethral

Fever,* where death followed the introduction of a bougie in six and-a-half hours. Fortunately, such tragical instances as these are exceedingly rare. Varying between the two extremes I have instanced, we meet with every degree of severity, but in all a resemblance to fever can be made out. I do not think I can better inform you about Urethral Fever than by narrating to you, in detail, the particulars of a case which, having been recently under my care in the Infirmary, many of you had an opportunity of seeing. Those of you who saw the case with me, will remember the extreme severity of the symptoms, and the small amount of hope we entertained of saving the patient's life. Fortunately, however, a fatal termination was avoided; and this, in a large measure, was due to the assiduous and unceasing care of those who watched the patient throughout his illness.

T. R., æt. 40, an engineer, was admitted into the Infirmary on September 30th, 1876. For some time previously he had suffered from stricture, the distress from which had recently much increased. I found a stricture in the membranous portion of the urethra, which would only admit a No. 3 bougie (English). Progress in treatment was very slow, the stricture being unusually hard to dilate. The urine, though passed in a small stream, was healthy. On October 20th, I introduced a Holt's dilator, but, as the instrument hitched at the stricture, and would not pass into the bladder, I postponed a further attempt. Some slight bleeding took place, which speedily stopped.

Four hours after this the patient was seized with a rigor. I should say that on no previous occasion had this occurred. At

* *Edinburgh Medical Journal*, 1871.

9 p.m., or three hours after the rigor, his temperature had risen to 104 Fahr.; at 12 (midnight) he vomited. At 5 a.m. on the following day (21st) he had another rigor, succeeded in an hour by vomiting, the temperature being 104 Fahr. On the occurrence of the first rigor, five grains of quinine were given to him, and continued every six hours for three doses.

On the next day (22nd) he had three rigors at intervals, followed by vomiting, the temperature varying between 95 and 102. At 5 p.m. on this day he, for the first time since the introduction of the instrument, passed urine. It only amounted to four ounces, was high-coloured, and highly albuminous, depositing half on boiling. He had, therefore, remained for over fifty hours without passing urine, and four ounces represented the extent of the excretion during this period.

On the 23rd his temperature varied between 94 and 96.2. He was exceedingly drowsy. The tongue was dry and brown, and the pulse quick and thready. There was, in fact, every indication of speedy death. At 10 a.m. on this day he passed two ounces of urine. The next day his temperature varied between 94 and 100. He passed nine ounces of urine, and vomited once. His general condition remained much as on the previous day. The skin was dry and of a dirty-sallow colour.

On the 25th he passed twenty ounces of urine during the twenty-four hours; on the 26th, eighteen ounces. The albumen had now fallen to $\frac{1}{12}$th. On the 27th, the temperature varied between 95 and 100. The urine was normal in quantity, but still contained albumen. At this date convalescence commenced, and by the 30th of October all grounds for uneasiness had disappeared, the urine being now normal, both in quantity and quality. Nutrient enemata were given whenever the patient was unable to take food in consequence of sickness; stimulants were also administered according to circumstances.

For the first four days the patient remained in a semi-

comatose condition, occasionally waking up and talking, or rather, muttering deliriously. This state of mind continued until the normal secretion of urine was re-established. The bowels were constipated throughout, and from time to time were relieved by enemata. He appeared to vomit, on the occasions mentioned, quite independently of any food he might have been taking. I was sorry that the vomited matter was not kept for closer examination, as this discharge might have been found to contain matter which should have been eliminated by the kidneys.

(T. R.) CASE OF URETHRAL FEVER.

Date.	Time.	Temperature.	Remarks.	Urine Passed.
Oct. 20.				
(Friday).	6 p.m.	103	Rigor.	
	9 "	104		
	10 "	103	Quinine 5 grs.	
	12 "	103.2	Vomiting.	None.
Oct. 21.	2 a.m.	103		
(Saturday).	3 "	102.8	Quinine 5 grs.	
	5 "	104	Rigor.	
	6 "	104	Vomiting.	
	7 "	103		
	8 "	102.4		
	9 "	100.8	Quinine 5 grs.	
	10 "	102		None.
	11 "	101.8		
	12 "	101		
	2 p.m.	100		
	4 "	99		
	6 "	98		
	8 "	96		
	9 "	97		
	12 "	95		
Oct. 22.	1 a.m.	96		
(Sunday).	2 "	100	Rigor.	
	3 "	100.2	Vomiting.	

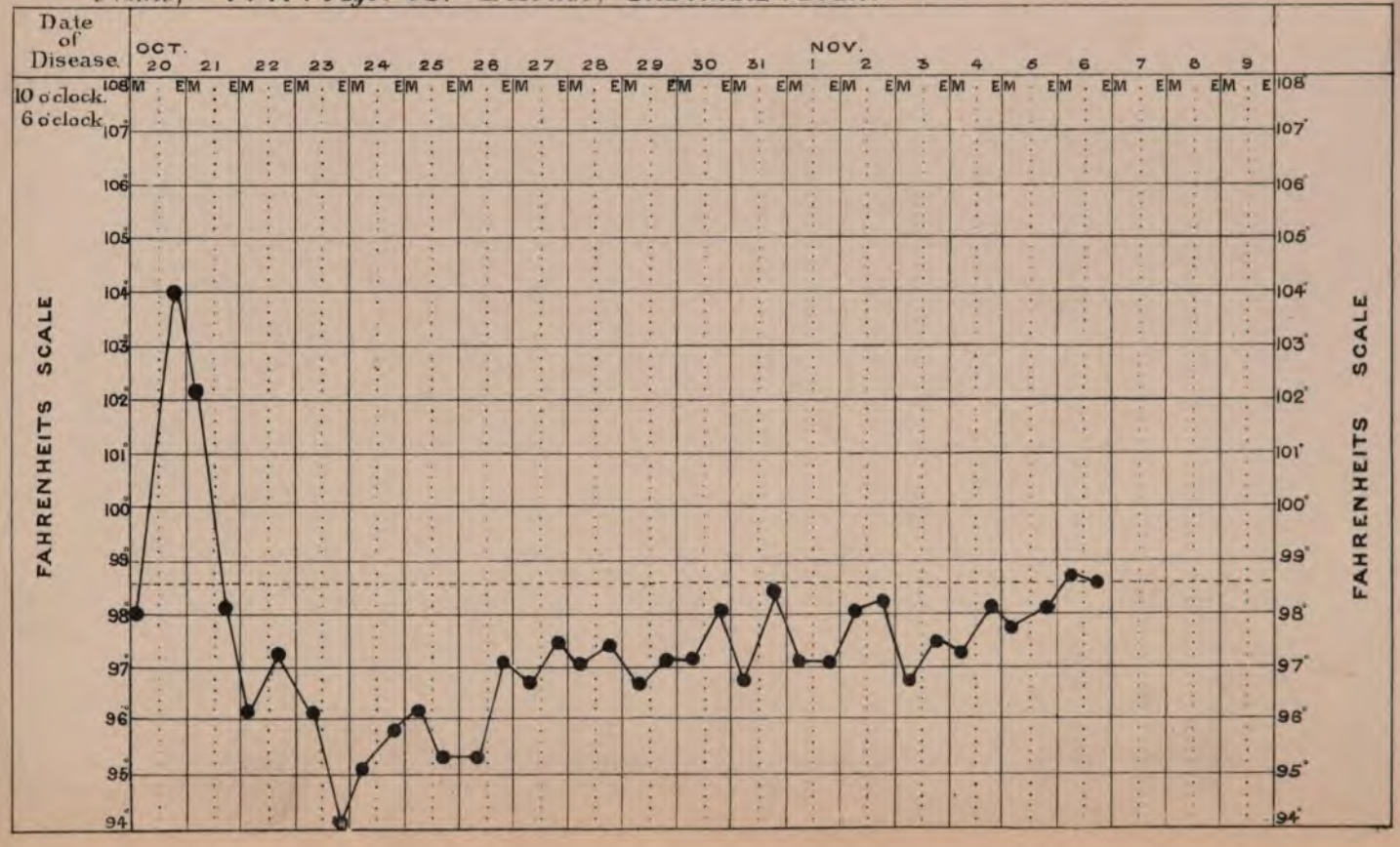
(T. R.) Case of Urethral Fever—*contd.*

Date.	Time.	Temperature.	Remarks.	Urine Passed.
	6 a.m.	96		
	8 "	96		
	10 "	96	Vomiting.	
	12 "	97	Rigor.	
	2 p.m.	98	Vomiting.	
	3.30 "	101	Rigor.	
	4.30 "	102	Vomiting.	
	5.30 "	97.2		4 Ounces.
	7 "	100		½ Albumen.
	9 "	100		
	11 "	97.6		
	12 "	96.4		
Oct. 23. (Monday).	2 a.m.	95.2		
	4 "	95		
	6 "	95		
	8 "	94		
	9 "	94.2		
	10 "	94		2 Ounces.
	11.30 "	94.4		
	1 p.m.	94.4		
	2 "	94.4		
	4 "	95		
	5 "	95		
	7.30 "	94		
	9 "	95		
	12 "	96.2		
Oct. 24. (Tuesday).	1 a.m.	98		
	3 "	100	Vomiting.	
	5 "	95		2 Ounces.
	7 "	95		
	9 "	95		
	11 "	94.1		
	1 p.m.	95		1 Ounce.
	3 "	95.2		2 Ounces.
	5 "	95		
	9 "	97.1		4 Ounces.

(T. R.) Case of Urethral Fever—*contd.*

Date.	Time.	Temperature.	Remarks.	Urine Passed.
Oct. 25. (Wednesday).	2 a.m.	96		
	4 "	94.6		
	6 "	94.6		
	9 "	96		17 Ounces.
	12.30 p.m.	94		3 Ounces.
	4 "	95.4		
	9 "	95		
Oct. 26. (Thursday).	2 a.m.	97		
	4 "	96		
	6 "	94.6		18 Ounces. $\frac{1}{12}$ Albumen.
	9 "	95		
	12 "	96.4		
	5 p.m.	97		
	9 "	97		
	12 "	101.6		
Oct. 27. (Friday).	2 a.m.	101.6		
	3 "	98		Normal in Quantity.
	9 "	96.8		Albuminous.
	12-30 p.m.	96		
	5 "	97.4		
	9 "	96.8		
Oct. 28. (Saturday).	1 a.m.	95.6		
	3 "	96.4		
	9 "	97		Albuminous.
	12-30 p.m.	97.2		
	5 "	97.2		
	9 "	97.2		
Oct. 29. (Sunday).	3 a.m.	96		
	9 "	96.4		Albuminous.
	12 "	96.8		
	5 p.m.	97		
	9 "	97		

Name, T. R . *Age* 40. *Disease,* URETHRAL FEVER.



(T. R.) Case of Urethral Fever—*contd.*

Date.	Time.	Temperature.	Remarks.	Urine Passed.
Oct. 30. (Monday).	7 a.m.	96		
	9 "	97		Normal, no [Albumen.
	12 "	97		
	5 p.m.	98		
	9 "	98.2		

Such, then, is an outline of this very interesting case. That these symptoms were occasioned by the surgical interference to which the urethra was subjected, no one can doubt, nor can we come to any other conclusion than that they were the immediate effect of shock propagated through the sympathetic system of nerves, which so largely supplies the generative organs.

In this case there was no evidence of previous kidney disease; the effect, however, produced upon the kidneys during the existence of the symptoms was very remarkable, excretion for a time being almost entirely arrested. As bearing upon the view taken that urethral fever is produced by nerve shock, I would mention that, on referring to my notes of those cases where anæsthetics have been used for catheterism, I find an almost complete absence of such symptoms, thus indicating that pain is an important factor in their causation. There is no character of pain so likely to produce shock as that the result of tension, as when a tightly-fitting instrument is slowly forced through a strongly-resisting contraction.

Persons who are suffering from kidney disorder, which is a frequent concomitant of stricture, are undoubtedly more liable to these attacks than those who are not. Such persons feel the effects of shock much more acutely than others, and consequently, in these cases, we must limit any surgical interference to that which is absolutely necessary for the preservation of life, regardless of other considerations. We are again reminded of the importance of making a careful examination of the urine in all cases where we are about to undertake the treatment of stricture. No cases are so much benefited by the employment of such medical and hygienic preliminaries as are usual in patients about to undergo a surgical operation as these, and when circumstances are not pressing, they should not be dispensed with.*

In the treatment of urethral fever, I cannot do more than endorse the favourable opinion which has been expressed as to the efficacy of Aconite and Quinine. The former is almost a certain prophylactic when administered in two minim doses of Fleming's tincture immediately after catheterism, as first suggested by Mr. Long.† On the latter, reliance must be placed on the development of the symptoms.

The most serious symptom is undoubtedly the suppression of urine which is met with in the severer cases. This is best met by acting upon the skin, and

* "I prepare all cases—with the exception, of course, of urgent cases—for five or six days before they are placed under mechanical treatment, and consequently now have in my own practice but few cases of urethral fever to treat." —*Diseases of the Urinary Organs*, Gourley, p. 38.

† *Liverpool Med. Chir. Journal*, January, 1850.

increasing the perspiration by the employment of vapour baths, or, where this cannot be done, by placing the patient for a few minutes in a hot bath, and then enveloping him in blankets. Dry cupping over the kidneys may also be advantageously employed. For its diuretic action, Gourley recommends that a teaspoonful of the infusion of digitalis should be given every hour or two, the effect on the circulation being closely watched. The infusion is preferred to the tincture or the extract, as being a more effective diuretic. Since seeing this observation by Gourley, I have tried digitalis in two cases of urinary suppression after catheterism, one in private practice, and the other in the Infirmary. In each instance the effect was most marked, and drew forth comment.

Hæmorrhage from the urethra is not an infrequent consequence of catheterism. When slight, it need not occasion any anxiety. In cases of granular urethritis it is difficult sometimes to pass an instrument without rupturing some of the minute blood vessels, which, in this state, remain in a highly congested condition. I saw, not long ago, in consultation, a case of hæmorrhage from the urethra, after catheterism, of an unusually persistent character. So exhausted was the patient that it became a consideration whether it would not be necessary to lay open the perinæum, and expose the urethra at the place where it was supposed to be injured. Before seriously entertaining this, I suggested that the subcutaneous injection of ergotine should be tried. After two injections the hæmorrhage entirely

ceased.* This patient appeared to have come from a family of "bleeders," a brother and a sister having died from persistent hæmorrhage, following trivial injuries. When the hæmorrhage is free and continues, there is then reason to believe that some laceration has been occasioned to the walls of the urethra, and that a false passage has been made. The damage that is inflicted in this way is sometimes very extensive. Not long ago, there was, in No. 7 ward, a case where I had unusual difficulty in passing a catheter for urgent retention of urine, in consequence of a false passage opening into the rectum, which had been made, a few hours previously, by a notorious secret-disease quack. After I had once succeeded in relieving the bladder, no further catheterism was necessary, and I delayed the passing of bougies for a fortnight. Fortunately, by this time, the false passage closed, and treatment was proceeded with as usual. The accompanying sketch shows what may be done in the way of making false passages (see Plate A). Here the instrument, having left the urethra in front of the stricture, is made to enter the bladder by a new route behind it.

When a false passage is made, it is usually along the floor of the urethra, the operator allowing the point of his instrument to drop, and then, when a hitch occurs, as the more fixed portion of the urethra is reached, exercising force. Now, as the deeper portion of the urethra can be readily explored by the finger in the rectum, whenever difficulty arises

* In the *American Journal of Medical Science*, of July, 1877, Dr. Boyland draws attention to the great efficacy of Ergot in urethral hæmorrhage.

here, or there is reason to believe that the instrument has deviated from its proper course, this means of assistance should never be forgotten. For, with the finger thus, the hitch may be overcome, or the wrong position of the instrument detected.

When a false passage has been made, it is better to suspend further instrumental treatment for some days; there is but little risk of extravasation of urine occurring, as the direction of the laceration is contrary to that of the stream of urine. On resuming treatment, care will have to be taken to avoid the position of the false passage, as, by repeatedly opening it up, it may be converted into a sinus. As I have already stated, false passages are usually made in the floor of the urethra. I pointed out an exception to this in the case of a patient who had an old false passage leading from the upper wall of his urethra; this, however, was so far satisfactorily explained to me as having been caused by the patient in using an instrument like a stylet, which he occasionally employed at sea whenever he considered that his stricture required "breaking down." I could pass a small elastic bougie into the false route, whilst another, at the same time, could be made to traverse the stricture into the bladder. This case was satisfactorily treated by Holt's operation.

SIXTH LECTURE.

RETENTION OF URINE — CATHETERISM — IMPASSABLE STRICTURE — ASPIRATION OF THE BLADDER — TAPPING — COCK'S OPERATION — FORCIBLE CATHETERISM.

OF all the operations in surgery, there is none, perhaps, that affords such immediate relief, or calls forth greater gratitude from the patient, than the successful use of the catheter for retention of urine.

This is the most distressing accident that can happen to a patient who is the unfortunate subject of stricture. The circumstances which bring this about hardly require any further notice here. Usually it is spasm superadded to organic stricture that occludes the urethra, and converts difficult micturation into complete retention. An excess of some sort is generally the exciting cause. In elderly persons especially, an attack of retention is often brought about by what is commonly called "catching cold," when the action of the skin is arrested, and a greater call is made on the kidneys to excrete. I need hardly remind you that a person may be passing urine, though at the same time, to all intents and purposes, he is suffering from retention; that is to say, his bladder is distended with urine. I have known this condition escape recognition, and the dribbling of

urine ascribed to incontinence or paralysis of the bladder. The diagnosis of retention is usually so simple, that it is merely sufficient to mention this to guard you against falling into such an error. Circumscribed distension above the pubes, and pressure on the rectum, serve to indicate to the touch that which the sensations of the patient are only too conscious of. In judging of the degree of distension, we must to some extent be guided by the sensations of the patient. If one man is only so distressed as to require relief by the catheter when the fundus of his bladder reaches his umbilicus, we must not infer that another less needs it, because this line has not yet been, in his case, attained. Our powers of endurance in this respect are very different. The patient with the small, contracted bladder, from long-standing stricture, suffers all the horrors of retention long before the limit I have indicated has been reached.

The consideration of treatment may be simplified very much by dividing the subject into two heads; first, where a catheter can be passed, and, second, where it cannot, or its use is impracticable. Where retention is urgent, it is undoubtedly the duty of the surgeon at once to attempt catheterisation. If he succeed, relief is immediate; and attention will subsequently be turned to the removing of the cause. Where retention is not urgent, a hot bath and a full dose of laudanum frequently produce the desired effect. A very opposite plan, viz., the introduction of a piece of ice into the rectum, is considered by some an almost infallible remedy; I believe this was first

suggested by Cazenave. Where there is much difficulty in getting through the stricture, Dr. P. H. Watson's steel probe-pointed catheter will be found exceedingly useful. It is described in the *Edinburgh Medical Journal*, of July, 1869. Its chief advantages are that, being made of steel, it is thoroughly rigid, and, therefore, under the absolute control of the operator; and, further, it possesses all the excellence of the smallest catheter with, from its probe-pointed extremity, all the facility of introduction presented by the probe-pointed bougie. The most recently-made instrument gradually increases in size from the bulbous extremity towards the handle, as shown in Figure 11.

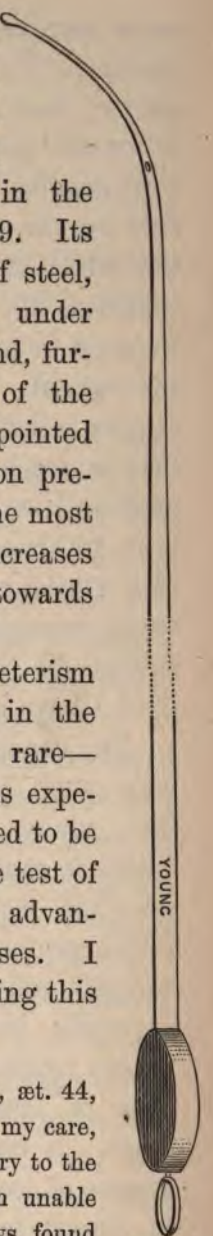


Fig. 11.

Turning to those cases where catheterism is impracticable — instances of which in the present day are fortunately exceedingly rare— we find ourselves provided with various expedients. Some have only to be mentioned to be condemned, whilst others have stood the test of experience. Aspiration has been very advantageously employed in this class of cases. I have selected the following as exemplifying this mode of treatment:—

Case 1.—In the summer of 1876, W. F., æt. 44, was admitted into the Royal Infirmary, under my care, suffering from a stricture, the result of an injury to the perinæum. On several occasions he had been unable to pass water, and much difficulty was always found

in relieving him by catheterism. During the last few months his stricture had become much tighter, so much so that the urine only escaped in drops.

I saw him at the time of his admission; his bladder was largely distended, and he was in urgent want of relief. On looking at his perinæum, I found an old scar, and around it considerable induration. I endeavoured to pass a small catheter, but without avail. As the abdomen was exceedingly tense and the patient in great distress, without further delay I punctured with the aspirator immediately above the pubes, and removed, I should think, three pints of urine. In the course of two hours I had the patient placed in a warm bath, and afterwards gave him a full dose of laudanum. The urine began again to issue in drops, and no further retention was experienced. I kept the patient in bed for four days, during which period no attempt was made to pass a catheter, nor was such necessary. It was interesting to notice how, under the influence of rest, alkalis and purgatives, the patient's powers of micturation improved. I subsequently gradually dilated the urethra until I could pass Holt's instrument, by means of which I ruptured the stricture. In the course of three weeks the patient left the Infirmary, being able to pass for himself a No. 12 bougie.

Case 2.—W. W——, a sailor, was admitted on April 24th, 1874, into the Liverpool Royal Infirmary, under my care, for retention of urine. The patient had suffered from stricture for three years, and for some time prior to his admission the stream of urine had been diminishing in size. Twelve months ago, when at sea, he had suffered from retention, and was with difficulty relieved by catheterism. Two days before his admission he had been drinking freely, and on his coming to the Infirmary he had not passed urine for some twenty-four hours.

On admission the bladder was largely distended. Catheterism was ineffectually tried. When I saw him, shortly after

admission, I found him in great distress. I attempted to introduce a catheter; but, from the state of the parts, I felt convinced that the instrument could not be made to enter the bladder without exposing the patient to injury by a persevering and perhaps protracted attempt to relieve him in this way. I then introduced into the bladder above the pubes one of the smallest needles of the aspirator, and removed a large basinful of highly-coloured urine. The patient was at once relieved. I gave him a dose of laudanum, and during the night he commenced to pass urine naturally in a small stream. A brisk cathartic was prescribed on the following day.

On the fifth day after his admission, without much difficulty, I passed a No. 3 bougie through a tolerably long and tight stricture. From this date gradual dilatation was employed, and on the 12th of May, when he was made an out-patient, dilatation had proceeded as high as No. 8. I should add, that he suffered no inconvenience from the supra-pubic puncture made by the needle, nor could any mark be discovered forty-eight hours afterwards.

It may be asked, was it impossible to introduce a catheter? I would not like to admit this in any case; for, assuming an average amount of dexterity, such an operation, in the greater number of strictures, is a matter of perseverance only. But what may be possible may not at the same time be expedient. In the second case a reasonable trial had been first made by the house-surgeon, but without avail; a warm bath and an opiate, pending my arrival, were also ineffectually tried. I was not surprised, on introducing a catheter as far as the obstruction, at this want of success, the stricture being dense, and unusually hard and resisting. As the patient required immediate

relief, the aspirator was resorted to in preference to the older plan of puncturing the bladder by a trocar and canula above the pubes or through the rectum.

It may be objected that the aspirator would only afford a temporary relief, inasmuch as the urethra was obstructed. To this I reply, that in the great majority of cases it is the spasm which, superadded to the stricture, determines the retention, and if temporary relief is afforded, the power of micturition becomes re-established.

Here the patient, in the course of a drunken debauch, had distended his bladder to a degree over which he could not exercise a proper expulsive effort. The bladder being artificially emptied, the patient's distress was at once relieved, and on the collection of water again in the bladder he took care that it should not remain there to exceed the limit over which he was capable of exercising successfully expulsive power. Time was thus allowed for getting the patient into a condition suitable for further treatment, and on the fifth day, as was predicted, the first step in the treatment by gradual dilatation was commenced, and uninterruptedly continued to a satisfactory issue. I would remark in passing, that the treatment by gradual dilatation was carried on more rapidly in this case than I could have wished, in consequence of the patient being very desirous to resume his work. Experience shows that dilatation, to be successful, should be very gradually employed.

As a means for relieving retention of urine arising from organic stricture, pneumatic aspiration cannot

fail to be exceedingly valuable; for, apart from the considerations I have urged, it is obvious that a stricture is never improved by anything like a prolonged effort at catheterism. Any laceration of the urethra (and where there is hæmorrhage this must to some degree occur) necessitates a corresponding cicatrisation, and this, by its subsequent contractility, adds to the obstruction. In tight strictures, with retention and a distended bladder, the difficulty in introducing a catheter is undoubtedly greater than when the bladder is capable of acting, and with this the risk of doing harm with the catheter is proportionately increased. The aspirator will in such cases be found a suitable means for tiding over that period of time where the difficulty is greatest, thus enabling the practitioner to commence his treatment under more favourable circumstances.

A considerable number of recorded cases show the safety with which the aspirator may be used; with a distended bladder it is impossible to injure the peritoneum, and if the finger is for a moment firmly pressed above the pubes before the instrument is introduced, until a pit or depression is formed, the passage of the needle is absolutely painless. My own patient's sensations would quite confirm the remark of a patient recorded by Dr. J. Bell in the April number of the *Edinburgh Medical Journal*, "that it was the easiest way of having the water drawn off he had ever experienced."

That the operation may be repeated an almost indefinite number of times is evident from a case recorded by Mr. W. Brown, of Callington, in the

British Medical Journal, of May 23rd, 1874, where, for retention from an enlarged prostate, it is stated, "we used the aspirator daily, and on some occasions the pain was such as to require the operation to be performed twice in the day. Altogether we performed the operation fifteen times, with immediate relief on every occasion, and without the smallest inconvenience or injury from the punctures or perforations of the needles."

Sufficient evidence, I think, has now been adduced to show that in the aspirator we have a valuable addition to our resources for the treatment of the class of cases such as I have illustrated.

I would just add a remark as to the kind of aspirator, as I have now employed the instrument on numerous occasions and for a variety of purposes. I much prefer the instrument where the reservoir and the exhausting syringe form two distinct pieces, as the simpler looking syringe-aspirator is very apt to get out of order, and by leaking and ejecting the fluid between the rod and its socket as the piston is worked upwards, to inconvenience the operator. The former instrument I have found free from this objection, and in all respects quite worth its rather greater cost.

Tapping the bladder with a trocar and canula above the pubes or through the rectum are expedients which, like aspiration, are only to be resorted to where there is a prospect of re-establishing within a short period the natural passage of the urethra.

The chief objection to the older methods of tapping by the rectum or above the pubes is that they

require the retention of the canula within the bladder for some days. This source of irritation not unfrequently occasions cystitis, and in other respects adds to the discomfort of the patient. Hence, as a temporary expedient for affording relief to the distended bladder, aspiration is to be preferred. Where the chance of restoring the urethra is only remote, as in some old-standing cases of stricture, Cock's operation "of tapping the urethra at the apex of the prostate, unassisted by a guide-staff," may be resorted to with advantage. I frequently see a patient upon whom I performed this operation some ten years ago. For five years previously he had endured all the vicissitudes that could happen to the subject of, at times, an impassable stricture. Since the operation he has enjoyed perfect health and comfort at the expense of micturating through the perinæum. Cock's operation is so well known that I need not further refer to it.*

It is the practice of some surgeons to do more than relieve by the incision the pressing symptoms, viz., the retention, and at the same time to include in this a division of the stricture. Such a proceeding, always difficult of accomplishment, is not to be recommended, it being better to reserve the treatment of the stricture until the retention has been relieved, unless, as sometimes happens, after the urethra behind the stricture has been opened with the knife, a guide can be passed into the bladder.

"Forcing the stricture" is a mode of proceeding so

* *Guy's Hospital Reports*, 1866.

likely to be attended with consequences similar to those pictured in Plate A, as not to be recommended. If you cannot pass a catheter by the exercise of a legitimate amount of firmness and tact, you are pretty sure to do harm by such hap-hazard manipulations.

In conclusion, let me urge the importance, in all cases of retention, of making a careful and well-directed effort to give relief to the patient in the most effectual and speedy manner, namely, by the introduction of the catheter. In but a few will you fail; it is only after such a trial as this has been made that you are justified in entertaining the other proposals to which I have alluded.

Retention of urine from enlargement of the prostate will be considered on a future occasion.

SEVENTH LECTURE.

External Urethrotomy — Syme's Operation — Selection of Cases — External Urethrotomy with a Guide — Without a Guide — Wheelhouse's Operation — Subcutaneous Urethrotomy.

We have recently had under observation several cases where a section of the perinæum has been performed for the treatment of stricture or some of the complications arising from it.

You are accustomed to see in the wards of this Infirmary a large number of cases of stricture; for the most part these are remedied by a much simpler proceeding, viz., by gradual dilatation. Exceptional cases not unfrequently present themselves where the usual mode of treatment has to be departed from, and more extreme measures resorted to. These exceptions to the rule will now occupy our attention. For the division of stricture from without, as at present practised, we are largely indebted to the late Professor Syme. I do not mean to say that he originated this operation, but he taught us how it might be the more efficiently performed, and to what class of cases it was applicable. It may be generally stated that perinæal section is resorted to in the worst forms of stricture; and this includes (*a*) strictures complicated with fistulous

openings, through which the urine escapes, and where it is necessary to provide a free and direct vent, so as to bring about the closure of these openings. (*b*) Strictures which are not remediable by dilatation, such as the extremely contractile strictures which follow laceration of the urethra, and are too extensive for treatment by internal urethrotomy. (*c*) Strictures which, so far as a catheter or bougie is concerned, are impassable.

The application of perinæal section to these three classes of cases necessitates the performance of the operation under two very different circumstances. First, with a guide, where section of the stricture is certain and complete; and, second, without a guide. It is better to restrict the term "external urethrotomy" to the former, and "perinæal section" to the latter. Where a staff can be passed into the bladder, the operation is comparatively simple. For its performance no better rules can be followed than those laid down by Syme. By carefully incising the perinæum from the raphé in the median line, the staff is reached, and by keeping the point of the knife in the groove, the stricture can be completely divided without injury to the surrounding parts. The knife must be kept undeviatingly in the central line of the perinæum; unless this rule is strictly adhered to, free hæmorrhage may be expected.

When such an operation has to be undertaken for impassable stricture, it is one of very considerable difficulty, often taxing to the uttermost the patience and perseverance of the surgeon. Under these cir-

cumstances, the most must be made of the two landmarks which such cases present; these are (*a*) the anterior extremity of the stricture, which is indicated by the point to which a staff can be passed, and (*b*) a dilated condition of the urethra, which is invariably found behind strictures of long standing, and which, when the bladder is distended, is evident to the touch externally, or to the finger in the rectum. To effect a junction between these two points, and to reach the contracted urethra by division of the stricture, two plans of proceeding are practicable. One is by incising the perinæum along the median line down to the point at which the staff is arrested, and from thence backwards towards the dilated portion of the urethra. The other consists in reversing this order of proceeding by plunging the knife towards the dilated portion of the urethra behind the stricture, and then carrying the incision forwards toward the permeable part of the urethra. I have practised both plans with success, but I am disposed to think that the former method is the one more generally to be recommended.

When the operation by either method is successfully practised, the operator should be able to pass a catheter into the bladder, along the whole length of the urethra, so that he can satisfy himself that the stricture has been completely divided. I usually leave a catheter in the bladder, introduced through the perinæal wound, for twenty-four hours after the operation. One of Holt's winged catheters answers admirably for this purpose. Subsequently the treatment consists in the introduction of bougies along the

urethra at intervals of four or five days, according to circumstances. Under this management the perinæal wound closes without trouble. The results of the operation have, so far as I have seen, been very satisfactory; I believe I have operated on twenty cases without a death. The effect on the stricture has also been decidedly beneficial. I do not mean to say that the patient can hope to dispense with the occasional introduction of the bougie, but what he may expect is that, with a moderate amount of care on his own part, his stricture, which previously caused him all manner of distress, will be by this operation rendered easily manageable.

As I have already said, the operation of external urethrotomy without a guide is one of very considerable difficulty, and no one can undertake it without fearing that, though the proximal portion of the urethra may be opened up, the stricture may escape that complete division which is essential to the ultimate success of the operation. To meet these difficulties an operation has been practised by Mr. Wheelhouse, which is now known as the "Leeds operation." Very considerable credit is due to Mr. Wheelhouse for the thoroughly practical manner in which the operation has been planned, and, inasmuch as you will only find a meagre description of it in the text books, I shall quote *in extenso* Mr. Wheelhouse's paper in the *British Medical Journal*, of June 24th, 1876:

"Notwithstanding the length of time that has elapsed since, in 1869–70, I brought before the profession, in the columns of the *British Medical Journal*, my method of finding my way, in

cases of impermeable stricture from the perinæum, *through* the stricture and into the bladder, the subject seems to have received so little notice, that I deem it advisable once more, after several years of successful employment of the operation, to revert to the subject; and I am induced to do this the more willingly, because I find that even in the most recent and most voluminous works on surgery, the subject is dismissed with very few words, and the old hap-hazard measure of reaching the bladder without any guide—it *may be through*, or it *may be altogether wide of the stricture*—is still recommended and described as the one in ordinary use. Over this method, the procedure which I adopt has at least the advantage of greatly increased precision; it renders an operation, confessedly hitherto one of the most difficult in surgery, a comparatively easy one, and one which, in my hands, and in those of my colleagues, has given results infinitely more favourable, both in immediate and ultimate effect upon our cases, than any we had ever seen before its introduction. The instruments required are as follows: lithotomy bandages; a special staff, fully grooved through the greater part, but not through the whole, of its extent, the last half inch of the groove being 'stopped,' and terminating in a rounded button-like end (Fig. 12); an ordinary scalpel; two

Fig. 12.

pairs of straight-bladed forceps, nibbed at the points; ordinary artery forceps and ligatures; sponge; a well-grooved and finely probe-pointed director; Teale's probe-gorget (Fig. 13); a straight probe-pointed bistoury; a short silver catheter (No. 10 or 11 gauge), with elastic tube attached.

"The patient is placed in lithotomy position, with the pelvis a little elevated, so as to permit the light to fall well upon it, and into the wound to be made. The staff is to be

introduced with the groove looking towards the surface, and brought gently into contact with the stricture. It should not

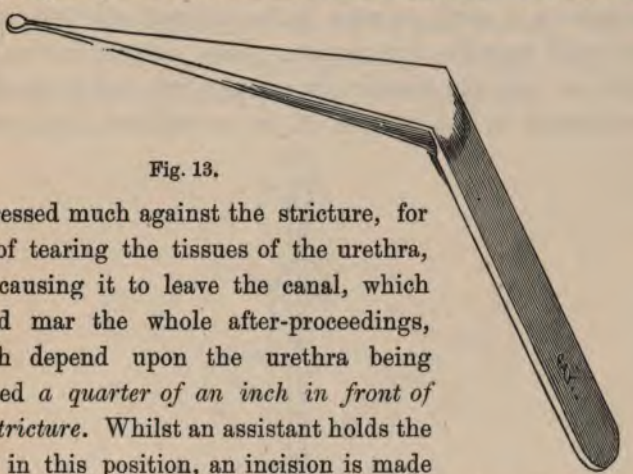


Fig. 13.

be pressed much against the stricture, for fear of tearing the tissues of the urethra, and causing it to leave the canal, which would mar the whole after-proceedings, which depend upon the urethra being opened *a quarter of an inch in front of the stricture*. Whilst an assistant holds the staff in this position, an incision is made into the perinæum, extending from opposite the point of reflection of the superficial perinæal fascia to the outer edge of the sphincter ani. The tissues of the perinæum are to be steadily divided until the urethra is reached. This is now to be opened *in the groove* of the staff, *not upon its point*, so as certainly to secure a quarter of an inch of healthy tube immediately in front of the stricture. As soon as the urethra is opened, and the groove in the staff fully exposed, the edges of the healthy urethra are to be seized on each side by the straight-bladed nibbed forceps, and held apart. The staff is then to be gently withdrawn until the button-point appears in the wound. It is then to be turned round, so that the groove may look to the pubes, and the button may be hooked into the upper angle of the opened urethra, which is then held stretched open at three points thus (Fig. 14), and the operator looks into it immediately in front of the stricture. Whilst thus held open, the probe-pointed director is inserted into the urethra ; and the operator, if he cannot see the opening of the stricture, which is often possible, generally succeeds in very quickly finding it, and

passes the point onwards *through* the stricture towards the bladder. The stricture is sometimes hidden amongst a crop of granulations or warty growths, in the midst of which the probe-point easily finds the true passage. This director having been passed on into the bladder (its entrance into which is clearly demonstrated by the freedom of its movements), its groove is

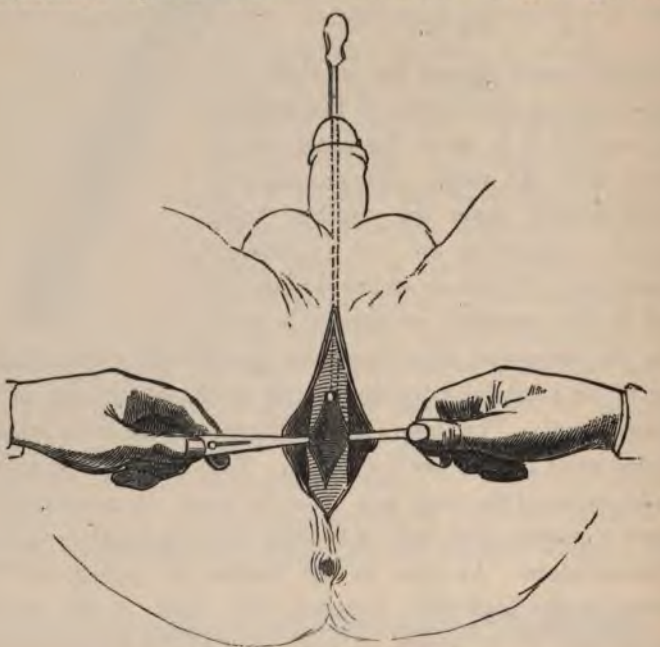


Fig. 14.—Staff introduced.

turned *downwards*, the whole length of the stricture is carefully and deliberately divided on its under surface, and the passage is thus cleared. The director is still held in the same position, and the straight probe-pointed bistoury is run along the groove, to insure complete division of all bands or other obstructions. These being thoroughly cleared, the old difficulty of directing the point of a catheter through the divided stricture and onwards into the bladder is to be overcome. To effect this the point of the probe-gorget is introduced into the groove in the director,

and, guided by it, is passed onwards into the bladder, dilating the divided stricture, and forming a metallic floor, along which the point of the catheter cannot fail to pass securely into the bladder. The entry of the gorget into the latter viscus is signalised by an immediate gush of urine along it.

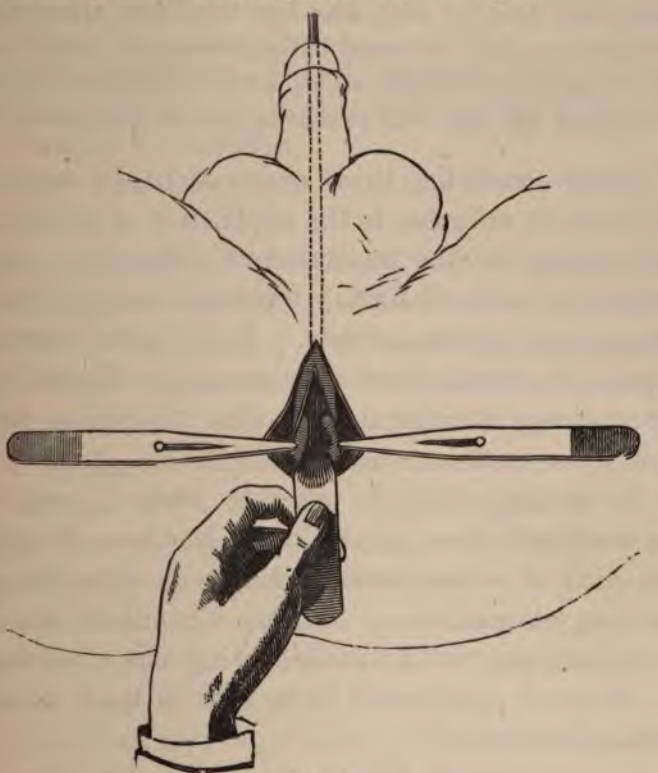


Fig. 15.

"The short catheter is now passed from the meatus down into the wound; is made to pass once or twice through the divided urethra, where it can be seen in the wound, to render certain the fact that no obstructing bands have been left undivided; and is then, guided by the probe-dilator, passed easily and certainly along the posterior part of the urethra into the bladder thus (Fig. 15).

"The gorget is now withdrawn; the catheter fastened in the urethra, and allowed to remain for three or four days; the elastic tube conveying the urine away to a vessel under or by the side of the bed.

"After three or four days, the catheter is removed, and is then passed daily, or every second or third day, according to circumstances, until the wound in the perinæum is healed; and, after the parts have become consolidated, it requires, of course, to be passed still from time to time to prevent recontraction."*

Before concluding these observations, let me say a few words in reference to the application of subcutaneous surgery to the treatment of stricture. Under favourable circumstances a stricture may be divided from without subcutaneously. It is limited, however, to penile stricture, where division can be effected without opening into the urethra, the obstruction being around the urethra rather than in it.

In a case of penile stricture where I removed the urethra from a patient in the Northern Hospital, who died of rheumatism, I found on dissecting up the mucous membrane, that its dimensions were in no way altered, the obstruction being entirely around it. Such a case would have been adapted to subcutaneous division.

I have practised this treatment in a few instances with excellent results.

* I am very much indebted to Mr. Wheelhouse, not only for allowing me thus to make use of his paper, but also of his original woodcuts explanatory of the operation.

EIGHTH LECTURE.

SYPHILITIC STRICTURES—NUNN'S AND BELL'S VIEWS—CHANCRE OF THE MEATUS—CASES OF STRICTURE COMPLICATED WITH SYPHILIS—TREATMENT.

IN a paper read before the Medico-Chirurgical Society, in 1866, Mr. Nunn, of the Middlesex Hospital, pointed out that many cases of stricture were of a syphilitic nature, and required for their treatment the employment of those means which exercise a curative power over this specific disorder.*

Though the pathology of venereal disorders was not then worked out as it is now, such a shrewd practitioner as Bell was not likely to be deceived in a matter of clinical observation. I have on several occasions had the opportunity of verifying the correctness of these views, and of recognising their value in the treatment of what, at first sight, appeared to be the

* Mr. Nunn has kindly referred me to a passage in Benjamin Bell's *System of Surgery*, Vol. 2, p. 221, fifth edition, where he states that "whatever may, in disorders of this kind, be the immediate cause of obstruction to the free passage of the urine, a venereal taint will for the most part be found to be the original cause of the whole. We have therefore desired that at the same time the use of bougies is persisted in, the patient ought to be put upon a very complete course of mercury, in order to destroy every possibility of his suffering again from the same cause; for we need scarcely observe, that as long as any venereal infection continues to prevail, little or no permanent advantage can be expected from the use of bougies or any other remedy."

worst forms of stricture, and I therefore consider it desirable that I should here draw attention to this complication.

I do not refer to the puckerings consequent on the healing of venereal ulcers, which are usually met with at the meatus, but to the deposition of syphilitic exudation about the urethra, perinæum, or scrotum, which, becoming organised, often in considerable masses impedes the dilatation of the canal. At first sight, from their extent and their extreme induration, they present a most unfavourable aspect, but on diagnosing their nature they eventually prove the most satisfactory to treat—thus again pointing us to the importance of recognising the constitutional origin of local disease.

I shall now proceed to illustrate certain forms of stricture having a syphilitic character, and to remedy which anti-syphilitic treatment must be resorted to.

And, in the first place, I would observe that an ordinary chancre at the meatus may act as a stricture, and be mistaken for one.

Some time ago I was consulted by a gentleman for what he was led to believe was a stricture of the meatus. His history was, that some three months previously he had a chancroid sore on his penis, which in the average time was healed by the usual remedies. The sore was considered to be of a local nature, and no secondary consequences were anticipated. Just about the time this sore was healing, an induration appeared at the meatus of the urethra, accompanied by a slight gleety discharge. This slowly but steadily increased

until it involved about the last inch of the urethra. As the induration increased, so did the difficulty in making water.

Upon examination, I observed the scar of the first sore in the sulcus, which was soft and apparently non-syphilitic. The orifice of the urethra was almost completely occluded by an indurated mass extending downwards for nearly an inch, and inverting the lips of the canal. I could pass through it with some tightness a probe, and on squeezing the urethra a small quantity of thin watery discharge exuded. One or two glands in the groin were indurated, but not extensively so. Though in some respects this case had the appearance of an ordinary stricture at the meatus, there could be no difficulty in arriving at the conclusion that the obstruction was caused by a chancre. I advised the discontinuance of local treatment by bougies, and that the patient should be put under the influence of mercury. In eight weeks the induration had almost entirely gone, and with it all difficulty in passing water.

The obscurity in diagnosing was in the sequence of the two forms of venereal sore, viz., the locally contagious and the infectious. I believe this to be an instance of double inoculation occurring at one time.

The next case illustrates better the connection which occasionally exists between stricture and syphilis.

In 1875, a gentleman consulted me for a stricture, which he informed me had been caused by an accident in the hunting field. From the description of the

injury, it was clear that if his urethra had not been actually ruptured, it had been contused. I think more probably the latter. At the time of the accident he was suffering from undoubted secondary syphilis.

For some weeks after the injury he experienced little or no inconvenience in passing water; he continued to take horse exercise, and paid no attention to the constitutional symptoms from which he was suffering.

In the course of three months after the injury symptoms of stricture appeared, and progressed rapidly, accompanied with induration behind the scrotum.

When I first saw him the signs of stricture had extended over seven months. The scar of the syphilitic sore was still visible on the penis, and remained indurated. Two or three small glands in the groin were also enlarged and similarly affected.

There was considerable induration to be felt in the perinæum, immediately behind the scrotum, and more so than appeared explicable by the injury he had received. I was consequently led to enquire closely into his history, with the result I have mentioned.

Upon examining the patient with a bougie, I found that a No. 3 was grasped with considerable tightness.

I came to the conclusion that the case was one of traumatic stricture, complicated with syphilis. I placed the patient under the influence of mercury, and commenced treatment by gradual dilatation. In the course of three months the induration in the perinæum, that was at first palpable to the touch externally, entirely disappeared, and a full-sized instrument could

be readily passed. I should also state that the hardness alluded to in the cicatrix on the penis and in the glands, also subsided under the influence of the mercury. The patient has since continued to pass a bougie for himself, and has had no further difficulty.

The third and last case I shall mention was under treatment in the Infirmary, where I took the opportunity of drawing attention to the special complication. The patient had suffered from stricture, which he attributed to a gonorrhœa. For two years nearly the whole of the urine had been freely passed through a fistula behind the scrotum, but little escaping by the natural channel. The perinæum, scrotum, and the edges of the fistula were as hard as cartilage, a condition which I at first attributed to the irritating influence of the urine and the persistence of chronic inflammation about the parts. In this case I also found that the patient had suffered from syphilis about three years previously, and there still remained further evidence of this. The throat was deeply scarred, there was an induration in the centre of the tongue, and an indistinct thickening of the periosteum on one clavicle, and over the shin. The patient was a sailor, and, according to his statement, had never received any treatment for his syphilis. With this history before me, and seeing that no serious inconvenience was experienced by the patient in passing his water, I resolved to rest content for the present by placing him under the influence of mercury. This was done and maintained for several weeks. Under this treatment the patient improved in a remarkable manner, and the

indurations disappeared to a very considerable extent. In eight weeks I commenced regular treatment by bougies, and before the patient left the hospital I had the satisfaction of finding the fistulous opening close, and the urethra capable of receiving a full-sized bougie.

I might further illustrate the connection that frequently exists between syphilis and stricture, but I think the cases I have recorded are sufficient for this purpose.

There are a few observations on the treatment of stricture occurring under these circumstances I should like to make. Where the syphilitic taint exists, the patient should be placed under the influence of mercury. There is no other drug upon which reliance can be placed. As a rule, I prefer the old-fashioned plan of inunction. By this means the effects of the drug can be easily regulated, a point of considerable importance in cases such as these, where it is necessary to keep up a prolonged but gentle effect. Anything like an excessive action should be avoided, the object in view being to accomplish what is required with as little disturbance to the patient as possible. Salivation is under all circumstances to be avoided. Occasionally inunction is found impracticable, either from the circumstances under which the patient may be placed, or the effect it produces upon the part to which the ointment is applied. I then prefer either the perchloride of mercury or the proto-iodide; the latter may advantageously be combined in a pill with a little Dover's powder. Local treatment, usually by dilatation,

will also be necessary. I have tried smearing the instrument with some mercurial ointment. I do not think, however, this is any advantage; on the contrary, the amount introduced into the urethra is so small as not to be of any avail, while it often rather irritates the urethra. For the same reason I do not employ urethral pessaries, preferring to produce the general effects of the drug by one or other of the plans more usually adopted for this purpose.

NINTH LECTURE.

Consequences of Stricture — Urethral Abscess — Fistula in Perinæo — Extravasation of Urine.

I have already indicated generally the consequences which stricture may occasion within the urethra and beyond it. To certain of these complications I purpose to make a further allusion.

A not unfrequent consequence of long-standing stricture is the formation of an abscess in immediate connection with the urethra; and where this takes place a serious aggravation of the damage usually ensues, exposing the patient to the risk of extravasation of urine, fistula, and impervious urethra. To explain the formation of abscess, we have only to notice the changes that take place in the urethra immediately behind the stricture. These have been observed to be a dilatation and thinning of the walls of the canal, and of the lacunæ and ducts opening into it. These changes are chiefly to be seen in the floor of the urethra, being caused by the pressure exercised by the bladder to force the urine through the contraction. In this way the urethra becomes a receptacle for urine, which, undergoing decomposition, sets up inflammation and suppuration both within and around it. Abscesses

so formed may, by ulceration, open into the urethra, and cause extravasation of urine. It is my belief, as I have already stated, that extravasation of urine as a consequence of stricture usually occurs in this way, and not from rupture of the urethra by the expulsive efforts of the patient; or, the abscess may result in the formation of a fistula, through which the urine, in part, or even entirely, is passed. Such consequences as these may usually be averted by prompt treatment. No rule in surgery is more uncompromising than that which requires the use of the knife in the case of all acute inflammatory swellings in any relation with the urethra. The neglect of this rule, for which in many instances the patient is solely responsible, has led to a disastrous destruction of tissue, and extreme danger to life. The risk of an urinary fistula is little to be compared with the damage that extravasated urine may inflict, and should never be taken into consideration.

In incising the perinæum to relieve an abscess, I have sometimes included the division of the stricture where I have been able to pass a guide into the bladder, as in the following case, which is a good illustration:—

J. B——, seaman, æt. 30, was admitted into the Infirmary under my care on January 11th, 1870. He has had stricture for nine years.

Recently he has been suffering from extreme irritability, his nights especially being much disturbed. The stream of urine has been gradually diminishing in size.

On admission into the Infirmary the bladder was found

distended, the urine issuing incontinently in drops. There was a perinæal swelling, with an indistinct sensation of fluctuation. The stricture was at the membranous portion of the urethra. The patient had had a rigor two days previously. As extravasation of urine was imminent, I had the patient placed in the lithotomy position, and putting my index finger in the rectum, I introduced a long straight finger knife into the median raphé an inch in front of the anus, and from the apex of the prostate gland divided in a direction forwards all the indurated and infiltrated tissues of the perinæum. This gave vent to some pus and a considerable gush of urine. I was then enabled to pass a centrally grooved staff into the bladder, and to complete the division of the stricture. There was no bleeding to speak of. I retained an elastic catheter in the bladder for some hours, and then removed it, allowing the urine to escape both by the urethra and through the perinæum. The after-treatment consisted in the introduction of bougies at regular intervals. The patient left the Infirmary on February 1st with the perinæal wound completely closed, and No. 12 bougie passing readily.

As I have already stated, urinary abscesses are not unfrequently followed by fistulous openings. We may have one sinus or more. In a case where I recently performed Cock's operation, there were so many that the perinæum, during the act of micturition, was not unlike the rose of a watering-can. In direction also these sinuses are sometimes remarkably tortuous, extending to the groin, the nates, or even to the thighs. Where they have existed for some time they often become exceedingly callous, their walls assuming the hardness of cartilage. In some cases I have found the induration is due to a syphilitic taint, which must not be lost sight of in treatment.

The treatment of fistula in perinæo in a large measure resolves itself into that of the cause, viz., the stricture; for we find most frequently that when the urethra is sufficiently dilated the fistula closes. We see this in cases of external urethrotomy, when, by keeping the urethra dilated, the perinæal wound heals without trouble. Though I have performed this operation on many occasions, I cannot ever remember a fistula resulting. Where stricture has been complicated with numerous fistulæ, I have successfully employed Syme's operation; by this means the discharge of urine is determined to the one opening, and by keeping the urethra dilated, this also eventually closes.

I have never found any advantage from the retention of a catheter in the bladder, with the object of curing a fistula, as the urine invariably makes its way into the fistula by the side of the instrument, but I have seen a fistula completely cured by the patient passing for himself a catheter on every occasion when he has been desirous of micturating. I remember a case being admitted into the Infirmary where an endeavour had been made to close a fistula by the injection of an irritant into it without any regard being paid to the stricture. The patient had been in the habit of passing his urine almost entirely by the sinus. The injection of this irritant led to inflammatory swelling, which blocked up the fistula, and, as might have been expected, brought on complete retention of urine. This was speedily followed by swelling of the perinæum, scrotum, and lower part of the

abdomen. Several hours elapsed before his admission into the Infirmary, by which time the scrotum had become almost gangrenous from extravasation. The patient being etherized, I laid open the perinæum, and on a small staff divided a hard stricture, making other incisions in the scrotum and adjacent parts, wherever extravasated urine rendered it necessary. The patient remained in a very critical state for several days, the tongue being dry and the pulse small and frequent, requiring a liberal allowance of stimulants, milk, and beef-tea. Though almost the whole of the scrotum sloughed away, the patient eventually made a good recovery.

Should a fistula fail to heal after the stricture has been sufficiently dilated, I believe Brodie's plan is about the best to employ. This consists in stimulating the bottom of the sinus by the occasional introduction of a small piece of nitrate of silver, at the same time retarding the healing of the *orifice* of the sinus (which is more inclined to heal than the bottom of it towards the urethra) by lightly touching it occasionally with the potassa fusa. For the same purpose the actual cautery, applied by means of a wire, has been recommended.

A fistula may lead, as I have already mentioned, to the occlusion of the urethra anterior to the opening. This condition is illustrated in the following case, where the fistula was formed by a perinæal incision, which was rendered necessary by the urethra being ruptured :—

This patient, a boy, æt. 11, I saw with Dr. Little, of

Everton. The patient had been crushed by a carriage, and had evidently sustained some severe injury to the pelvis as well as to the urethra. He had complete retention, and we were unable to get the catheter further than the deep fascia, where the urethra appeared to be completely severed. Under these circumstances we agreed that a free perinæal incision was required, and this I accordingly made. A considerable quantity of urine and extravasated blood escaped. A fracture of the pubic arch was also discovered. For several weeks the patient remained in a very precarious state, as the injury was followed by an acute attack of peritonitis, and for weeks all urine escaped by the wound. As soon as the patient's health permitted it, I attempted to establish the continuity of the urethra ; the canal having been completely severed, the distal end had closed. This was a very troublesome affair, but eventually it was accomplished, and the perinæal wound healed. I had the patient under observation for nearly eighteen months, and when I last examined him, though the urethra admitted a full-sized bougie, yet the point of injury was rough and cicatricial, so that I fear there may be some permanent contraction.

When urine escapes from its normal channel and becomes diffused amongst the tissues, extravasation or infiltration is said to have happened. The effect produced upon the tissues, with which urine comes in contact, is to destroy them ; hence it is of the first importance, with as little delay as possible, to give free vent to that which has been extravasated.

Though in no way altering the rules for our guidance in the treatment of extravasated urine, I may mention that Menzel* has demonstrated that this destructive effect on the tissues is only the property of

* *Wien. Medizin. Wochenshrift*, No. 81–85, 1869.

decomposed ammoniacal urine, and does not belong to that which is limpid and healthy, the latter when effused being capable of absorption.

In practice, however, we draw no such fine distinctions. When urine is extravasated it is the duty of the surgeon to provide channels for its escape, and unless this is done, great destruction of tissue invariably follows.

Extravasation may occur either in connection with urinary abscess or with laceration of the urethra. The extent of skin which perishes is sometimes very extensive. In the following case the whole of the scrotum was in this way destroyed :—

J. M——, æt. 30, was admitted into the Northern Hospital under my care on November 4th, 1867. For several months he has experienced difficulty in passing water, and for the last week he has only voided it in drops. Three days before admission, after violently straining, his scrotum began to swell and increased in size to an alarming extent.

On admission to the hospital the whole of the scrotum was gangrenous, and the lower part of the abdomen œdematous. The perinæum was not swollen. A stricture existed four inches from the meatus. The cavity of the right tunica vaginalis was full of fluid.

Free incisions through the sloughy mass were made. The hydrocele was also punctured. The whole of the scrotum came away, leaving the testicles completely exposed and pendulant. On November 10th there was a discharge of pus from the urethra. Gradual dilatation was subsequently employed. After a very tedious convalescence the patient left the hospital quite well. His testicles, however, were not very comfortably located, the new scrotal receptacle for them formed by granulation being inconveniently limited.

The direction extravasated urine takes is determined by the connection of the fasciæ in relation to it. This is explained by a reference to Figure 4.

When extravasation takes place behind the triangular ligament, it is almost invariably fatal by the induction of pelvic cellulitis. We see this in cases of lithotomy where the knife has been used with too great freedom on entering the bladder. When urine is conducted beneath the skin of the abdomen, it may travel as high as the umbilicus, as in the following case, where so much of the abdominal parietes was destroyed as to interfere with micturition :—

Charles W——, æt. 30, was admitted into the Infirmary under my care on September 30th, 1875.

The patient, when about ten years old, fell on an iron rail, injuring his perinæum. A stricture followed and was treated in the usual manner, but ever since he has suffered from severe attacks of retention requiring catheterism. About five years ago he had an attack of gonorrhœa, since which his stricture has been worse and retention of urine more frequent. A week before admission, had increased difficulty, passing his urine in drops and with much pain. On September 30th, in violently straining to make water, he felt something give way, accompanied with an immediate sensation of relief. This was followed by rapid swelling of the scrotum, extending to the abdomen. He was then removed to the Infirmary. The perinæum and scrotum were enormously swollen, the swelling extending upwards to the abdomen. The bladder, apparently, did not contain much water. The patient was placed under the influence of ether, when the perinæum was freely incised, the urethra being opened on a staff so as to ensure the complete division of the stricture. Free

incisions were also made in several directions into the scrotum. A No. 8 elastic bougie was put into the bladder through the urethra, and retained. The urine continued to escape partly through the catheter and some through the wound. On the following day it was found necessary to make further incisions on either side of the abdomen, the urine having passed upwards almost to a level with the umbilicus. At the expiration of forty-eight hours the catheter was removed, but it was found necessary to replace it, the patient being unable to pass urine without it. There was no difficulty in putting a full-sized catheter into the bladder, so that I apprehended the inability to pass water was due partly to the previous over-distension of the bladder, and partly to the damaged condition of the abdominal muscles, which rendered any voluntary propulsive efforts on the part of the patient exceedingly painful. It was not until the abdominal wounds began to fill up with granulation that the patient recovered the power of micturition. A considerable portion of the scrotum mortified, and large sloughs of cellular tissue were discharged through the incisions in the abdominal walls.

The patient made a good recovery, and left the Infirmary on November 22nd. The wound in the perinæum and the other incisions closed up. At the time of his leaving the Infirmary a full-sized bougie passed readily.

There is one sign in connection with extravasation which is usually regarded as fatal. Brodie states,* "Sometimes a black spot may be seen on the glans penis; it is a most fatal sign, for I never knew one to recover in whom it appeared. It indicates that the urine has been effused into the cells of the corpus spongiosum." I have seen two examples of this, in each instance with a fatal result.

* Brodie on the *Diseases of the Urinary Organs*, p. 14.

In the treatment of extravasation there are two points which must be given effect to; first, to prevent any further infiltration occurring, and, second, to secure a means of escape for the urine which has already become diffused amongst the tissues. The first indication is met by providing a direct escape for the urine by a perinæal or other suitable incision, and the second by further incisions, wherever there are grounds for believing that urine is lodged.

In the future management of these cases it is most important that the strictest cleanliness should be insisted upon. Where there is much sloughing the wounds are necessarily offensive, and great care is required to keep them sweet. They should be syringed out regularly with tepid carbolic lotion, of the strength of one part of acid to sixty of water. Poultices are the best application during the separation of the sloughs, and after this water dressing or some stimulating lotion. Where there has been much destruction of the scrotum, advantage may be gained after the sloughs have separated by drawing the parts together by strapping.

In insisting upon the strictest attention to general hygienic measures, it must be remembered that septicæmia and pyæmia are the more frequent causes of death in these operations. That sickly urinous smell which so often hangs about the apartment and appointments of the urinary invalid is not uncommonly due to a want of cleanliness on the part of the patient or his attendant.* The ventilation of the

* In keeping the bed of the patient sweet I have found a very simple con-

apartment must be carefully seen to; remembering that cold, by checking the action of the skin, invariably increases the distress of the patient suffering from an urinary complaint. Where there has been much damage done by extravasated urine, the patients are apt to pass into a low typhoid state, and when the pulse and dry state of the tongue indicate this, stimulants and highly nutritious fluid foods are required. In one or two of the cases recorded the danger from this condition was great. The nervous irritability which is so frequently observed in these cases, I have found best relieved by small doses of morphia hypodermically administered.

trivance, which was first suggested to me by Mr. Long, exceedingly useful. It consists in placing in the patient's bed a perforated wooden pill-box, containing a dozen grains or so of pure iodine.

TENTH LECTURE.

Injuries to the Urethra — Contusion — Rupture of the Urethra—Cases — Treatment — Longitudinal Wounds of the Urethra.

Injuries to the urethra not only expose the patient to the risk of retention and extravasation of urine, but are usually followed by a stricture of the worst form.

In a seaport like this a very considerable proportion of the stricture cases are met with amongst its sailor population, and of these, a large number I have observed are traceable to injuries received in the course of their employment. Such, for instance, as blows on the perinæum, by falls over ropes and spars, where the urethra is violently stretched or contused against the pubic arch. A contusion of the perinæum, without any obvious tearing of tissue, is quite sufficient to occasion retention, and require the use of the catheter; but inasmuch as the urethra escapes without laceration, the inconvenience is a temporary one, and the formation of a stricture need not be apprehended.

There was a patient not long ago in one of my wards who was injured in this way. He had fallen a considerable height over some railings, alighting upon his perinæum. On admission into the Infirmary some

hours after, the perinæum and scrotum were very much swollen and ecchymosed. Though he could not pass water, yet there was no difficulty in introducing a catheter into the bladder. Nothing like a rent could be felt, and no blood appeared to have escaped from the orifice of the urethra. It was a case of contusion with very considerable ecchymosis, and after the lapse of forty-eight hours no further catheterism was required. Had there been evidence that the urethra was torn, it might have been necessary, as I shall presently state, to adopt a very different treatment. Actual laceration of the walls of the urethra may be caused from within as in attempts to pass catheters, or in the expulsion or removal of calculi. Occasionally such an injury is inflicted by a fractured pubic bone, as in the case recorded on page 90.

It is, however, to the consideration of lacerations caused by violence applied externally that I wish now to direct attention, and with a view of making observations on the treatment of these injuries, I purpose to narrate the following cases which I have collected:

Case 1.—A labourer, æt. 20, was admitted into the Northern Hospital under my care in August, 1866. Eighteen hours before admission he had received a kick on the perinæum. Blood issued from the orifice of the urethra, and he shortly afterwards found himself unable to pass water. For this he applied at the hospital. With some difficulty a No. 7 catheter was introduced, a distinct laceration being felt about the bulb. Two pints of bloody urine were removed, and the catheter was then retained in the bladder. No further difficulty was experienced. The patient made a good recovery. A contraction

about the lacerated part ensued, and for several months the patient attended as an out-patient for the purpose of having the urethra dilated by bougies. Eventually he was lost sight of, some contraction then remaining.

Case 2.—A dock labourer was admitted into the Northern Hospital under my care in 1866, having fallen from a height astride over some scaffolding.

On admission the perinæum was bruised, and blood was passed by the urethra. On introducing a catheter a rupture of the urethra, about the triangular ligament, was made out. The laceration did not appear completely to sever the urethra, for with a little trouble the catheter was introduced into the bladder. In this position it was retained, and up to the fifth day the patient appeared to make satisfactory progress. On this date, however, the patient became feverish; the perinæum was found swollen, and there was much pain about the part. Under these circumstances I opened the perinæum freely, dividing the urethra forwards from the apex of the prostate. Vent was thus given to disorganised clots, and some fetid pus, and a certain amount of immediate relief was afforded. On the ninth day from the injury there was a rigor, and the patient rapidly succumbed, with well-marked symptoms of pyæmia. I was only able to inspect the injured part after death, when I found that the urethra had been almost completely, though irregularly, ruptured in the membranous portion. There were also signs of rapidly extending pelvic cellulitis.

Case 3.—About the same time as the previous case a sailor was under my care at the Northern Hospital for very similar injuries caused by falling across a rope.

Here the signs of a rupture of the urethra in its deeper part were equally unequivocal. With some difficulty I introduced a grooved staff, and freely laid open the perinæum and urethra to an extent sufficient to secure a free vent for the urine.

The patient made a good recovery, and the perinæal wound

completely healed. During the healing process bougies were regularly introduced. I saw the patient not long ago, and he appeared to suffer no inconvenience from his accident. The urine was voided in a natural stream.

Case 4.—A 'bus conductor, æt. 17, was admitted into the Infirmary under my care in 1869, with the following history. Seven days before admission he was kicked on the perinæum; this was followed by slight hæmorrhage from the urethra, but he was able to pass his water.

On the day of his admission to the Infirmary (the seventh from the accident) the hæmorrhage recurred, and he had retention of urine. A No. 9 catheter was introduced, and a considerable quantity of urine withdrawn. Two days after this he became feverish, the perinæum was swollen, and there was some pain about the part. To relieve this a free incision was made into the urethra along the central raphé, through which all urine passed. This was followed with relief. He made a good recovery, and left the Infirmary with the perinæal wound completely closed. The urethra appeared to be lacerated about the membranous portion along its lower wall. During the process of healing, bougies were introduced in increasing sizes. He left the hospital with a urethra admitting a full-sized bougie, and I never heard afterwards that he suffered from stricture.

Case 5.—A stonemason was admitted into the Infirmary under my care in 1870. He had fallen across a sharp stone, considerably bruising his perinæum.

On his admission he had the usual symptoms of lacerated urethra, viz., blood issuing from the orifice of the urethra, and retention of urine. A catheter disclosed a considerable rupture about the deep perinæal fascia. I accordingly laid open the perinæum freely in the middle line, giving exit to clots and forming a passage for the urine to escape.

The patient had rather a sharp attack of orchitis, but with

this exception made an excellent recovery. The treatment consisted in the regular introduction of bougies whilst the perinæal wound was healing. When he left the Infirmary the perinæal wound was closed, and the urethra of its natural size. I saw him some months afterwards, and he remained quite well without any sign of stricture.

In reference to the question of treatment, the cases I have recorded justify a conclusion that in all such injuries external incision, or, as it is more commonly called, perinæal section, is the safest plan of proceeding, recommending itself on the following grounds :

1st. Because of the impossibility of accurately determining the extent and direction of the laceration.

2nd. Because incision is the surest means of preventing extravasation of urine ; and

3rd. Because incision diminishes the risk of a stricture forming, or, at all events, moderates the severity of such a formation.

The relative position of a laceration to the deep perinæal fascia is a matter of the first importance. Were it possible in all cases to arrive at the conclusion that the lacerated portion was anterior to the deep fascia, provided a catheter could be introduced into the bladder, it would be safe to treat the injury without incision, resorting to such a proceeding should signs of extravasation of urine appear ; for, under these circumstances, the direction taken by extravasated urine is forward towards the scrotum, where it renders itself unmistakably apparent from the moment of its occurrence. Where the laceration is behind the deep fascia, the extravasation, should it follow either immediately

or in the course of a few days, is of a much more serious nature, inasmuch as the urine takes a backward direction towards the pelvis, setting up cellulitis, which speedily goes on to suppuration. Here it is much more subtle; it may be going on from the moment of the injury, not declaring itself until it has occasioned symptoms of pelvic cellulitis.

The former variety of extravasation is usually amenable to treatment, but the latter, where it has actually occurred, is most frequently followed by a fatal result. Case 2 illustrates this, and Case 4, though the patient was saved, undoubtedly is a similar example. Inasmuch, then, as the precise position of the laceration, whether it is a few lines in front of the deep fascia, or a few lines behind it, determines in a great measure the after-consequences, so far as extravasation of urine is concerned, is it not better to act on the safer side in these cases of deep laceration, and anticipate the risk of retrograde inflammation?

The second proposition, that incision is the safest means of preventing extravasation naturally follows on admitting the impossibility of precisely determining the position of the injury to the deep fascia. No other plan than that of opening up the injured spot, and thus forming a direct course for the urine to escape, can be relied upon. In instances where the urethra is completely torn across it is usually impossible to introduce a catheter, and here, under all circumstances, the line of action is evident enough. Where a catheter can be introduced it may be objected that incision is unnecessary, but it must be remembered that the

constant presence of such an instrument in the bladder is no safeguard whatever against the occurrence of extravasation, whilst its continual pressure on the swollen and inflamed urethra at the part injured is likely to be followed by sloughing of the canal and a proportionate extension of any subsequent stricture.

In reference to the third conclusion, that incision diminishes the risk of stricture, or moderates the extent of such a formation, it may be stated generally that the worst forms of stricture are usually those following laceration of the urethra, and when we consider the circumstances under which such wounds heal where no artificial vent is provided, this is not to be wondered at. The wound in the urethra is more or less lacerated, it heals under the irritating influence of constant contact with urine, and inordinate plastic exudation is usually thrown out around the wound. On the other hand, in cases where the urethra when lacerated is opened by perinæal incision, we have still the original injury; but the circumstances are more favourable for limiting action. Free vent is here given for all that proves of an irritating nature, and the exudation lymph is merely sufficient for coating over the incised tissues.

Longitudinal incisions of the urethra are not usually followed by stricture. We have an illustration of this in the operation of lateral lithotomy, where the formation of a stricture following the incision into the urethra is a rare event, and probably traceable to some laceration or contusion of the passage in extracting the calculus.

The following case may be mentioned as further illustration of this observation :—

In 1866, a patient was admitted into the Northern Hospital, under my care, suffering from an incised wound of the perinæum, received in the course of what was described to me as "a free fight," and where further details were not to be had.

The wound was just behind the scrotum, and was very similar in appearance and direction to that which a surgeon would make in opening the urethra in this position. It was a little to one side of the raphé, and was an inch and a half in length. Some hours elapsed before the patient was brought to the hospital. I found the wound plugged with lint, and blood was issuing from the penis. As the bleeding was free, I had to enlarge the wound to enable me to secure what I believe was the transverse perinæal artery. This was sufficient to arrest the hæmorrhage. I could put my finger into the urethra, which had been very neatly incised for about an inch along its floor. Urine escaped freely through the penis, and partly through the wound, for some three or four days. After this time the urine was passed naturally, and the wound closed. I saw the patient about two years afterwards, when he had no sign of stricture, or other indication beyond the scar of the injury he had received.

In the after management of cases of ruptured urethra great attention should be paid to cleanliness, to secure which the wound should be syringed out at least twice daily with weak carbolic lotion. I find no better application to the perinæum than tenax; it absorbs the discharge and acts as a disinfectant. After the lapse of a few days the introduction of bougies along the whole length of the urethra should be commenced, and continued at regular intervals.

When the wound has healed, the patient should be instructed how to introduce an instrument for himself, the use of which he should continue, to prevent any contraction of the urethra taking place.

ELEVENTH LECTURE.

INTERNAL URETHROTOMY — SELECTION OF CASES — OTIS'S VIEWS — VARIOUS METHODS OF PERFORMING INTERNAL URETHROTOMY — THE USE OF OVAL BOUGIES — HOLT'S OPERATION.

THE division of strictures from within the urethra—internal urethrotomy—is a mode of treatment which has long been practised, and as at present performed may be regarded as both certain and safe. In no department of surgery has greater ingenuity been shewn in the devising of instruments than in this, and to attempt anything like a full description of the various urethrotomes in use would here be foreign to my purpose. I shall therefore content myself with drawing attention to those proceedings which experience has shewn me to be best adapted to the purpose in view. The cases which are suited to this plan of treatment include those resilient forms of stricture, which are not only tedious and painful to stretch by gradual dilatation, but which speedily contract on the suspension of treatment. You have seen cases of stricture successfully treated by a course of dilatation, and, after a short absence from our care, return with all the difficulties which they first manifested. These, as a rule, are permanently relieved by internal urethrotomy.

Again, experience teaches us that contraction of the meatus, and penile strictures generally, are best remedied by division with the knife, and this is in a large measure due to the precision, arising from their position, with which their section can be accomplished.

Further than this, Dr. Otis, of New York, has considerably extended the field, for he practises this plan of treatment in the earliest forms of urethral obstruction, hoping thereby to effect a permanent cure of the disorder.*

Dr. Otis very properly points out that nearly all contractions of the urethra are due to inflammation, and that "gleet is the signal which nature hangs out to call attention to the fact that the urethra in which gleet occurs is always strictured at some point." Subject to the reservation that a congested urethra, such as we have in gleet, as shewn by endoscopic examination, necessarily lessens to some extent the calibre of the canal, we may admit the truth of this. Further than this, we may agree with Dr. Otis, that there is some variety in the dimensions to which the urethra may be stretched, either as in the act of micturition or in the receiving of a bougie, just as there is a variation in the size and shape of the penis.

Based upon these conclusions, Dr. Otis proposes a method of treatment, which consists in the division of such portions of the urethra as do not come up to the standard of the "individuality," by a certainly very ingeniously devised instrument; subsequently the proper dimension of the canal is maintained by the use

* "The Treatment of Stricture of the Urethra," by F. N. Otis, M.D., *British Medical Journal*, Feb. 26th, 1876.

of dilators. Now, whatever the ultimate good results may be, I hardly think any one of us would like to repeat the experience of Mr. Berkeley Hill, as recorded in the *Lancet*, of April 8th, 1876. "I may state that all the cases operated upon here were those of long-standing gleets, with contraction in one or more parts of the spongy urethra, and had undergone multifarious treatment. The number of patients is sixteen: fifteen of my own, and one of Dr. Otis'. In five cases the gleet stopped after the operation, and the patient was, at the last report—taken, in none less than three weeks, in most some months, after the operation,—able to pass a bougie of the estimated size of the urethra. In short, they may be claimed as cures. But of these five the operation was serious to two; one had free bleeding for three days; the other three attacks of rigors; of the remaining eleven, among whom Dr. Otis's own operation must be included, the gleet persisted in all; in several the urethra shrank again to its size before the operation, and in some very serious complications ensued. In four bleeding lasted several days, and in one was even alarming."

My own observation is certainly not favourable to Dr. Otis's method. I have already expressed my belief that stricture in its earliest form is curable, provided that dilatation by bougies is sufficiently carried out. Hence I reserve for internal urethrotomy cases which are not likely to be benefited by dilatation, and these, so far as my experience goes, do not include strictures in their early stage.

In contractions of the meatus of the urethra division may conveniently be accomplished with a blunt-ended tenotomy knife. I usually make two incisions, one on either side of the median line, directed somewhat obliquely. In strictures further down the canal, but still within the penis, division may be performed with the *bistourie caché*, or with an instrument which I have found very useful for this purpose, viz., a probe-ended knife; this may be readily manipulated within the stricture, and its division completed. (Figure 16.)

Fig. 16.

In the deeper portion of the urethra, division is not so readily accomplished; for its performance we are provided with two sets of instruments, viz., those cutting from before backwards, of which Maisonneuve's and Teevan's urethrotomes are examples; and those cutting in an opposite direction, amongst which I may mention Watson's and Civiale's. Of these instruments I certainly find that Watson's is the best.* In principle it resembles the staff used by Syme, to which is added a knife concealed in the narrow portion of the guide, immediately in front of the shoulder, which indicates the position of the stricture to be divided. The protrusion of the knife is regulated by a screw at the handle, and by means of a dial attached to the screw the degree to which the knife is projected is at once indicated. (Figure 17.)

* *Lancet*, October 23rd, 1875.

Fig. 17.

One of the last cases I operated upon is a good example of this plan of treatment:—

J. H., a seaman, æt. 40, was admitted into No. 1 ward in September, 1877, for stricture, from which he had suffered for some years, and which had been treated on several occasions by gradual and continuous dilatation. The stricture was situated at the bulb, and would only admit a No. 1 bougie. Dilatation was an exceedingly painful process, the passage of the bougie being invariably followed by a severe rigor; further than this, the stricture was very contractile, and slow progress only was made. I considered this a suitable case for internal section. A fortnight after his admission I was able to introduce Watson's urethrotome, with which I divided the stricture; afterwards I readily passed a No. 12 catheter, and emptied the bladder. On the following day, instead of difficulty in micturition, he passed to the opposite condition, and complained of inability to hold his water. This I have noticed on several occasions; it is due to the suddenness of the relief afforded by the removal of the stricture, before the bladder can adapt itself to the altered conditions. In the course of a few days this new source of difficulty, as I had assured the patient, disappeared, and the full size of the urethra was maintained by the introduction of a suitable bougie. This operation the patient was soon able to accomplish for himself, and when he left the hospital, which he did in a fortnight, all difficulty in passing water was removed.

I have recently been using, as some of you may have seen, a urethrotome which has been constructed for me by Messrs. Krohne & Sesemann, of London, and which is somewhat different to the instruments at present in use or figured in the text books.

The staff consists of two parts, viz., the anterior portion, sufficiently small to pass into the narrowest strictures, and behind this an expanded portion, corresponding in size to a No. 10 bougie, and terminating anteriorly in an abrupt shoulder. Within the broad portion of the staff is contained a lancet-shaped knife, which is made to project by a spring at the handle, and run along a slit in the narrow part of the instrument. The extent to which the blade can be projected is regulated by a screw. It can be easily taken to pieces for the purpose of cleaning or re-sharpening the knife, by unscrewing the stylet at the handle, when the blade becomes disengaged, and can be taken from the slit. In the accompanying drawings the instrument is represented closed (Fig. 18), and with the knife projected (Fig. 19) as for the division of a stricture. When the instrument is passed down the urethra, the position of the stricture is indicated by the broad shoulder, against which it is made firmly to press, as in Syme's staff for perinæal section. The position of the stricture being thus ascertained and commanded by the broad shoulder, the knife is then made to project, and to divide the stricture. If the instrument is held firmly, the division of the stricture is usually indicated by the feeling of tension giving way, something like when

a tendon is divided for the cure of a deformity. The knife is then withdrawn, when, if the stricture has been completely divided, the broad shoulder passes on readily towards the bladder. Should any further obstruction be indicated, its division may in the same way be accomplished. I usually pass a full-sized catheter into the bladder, to make sure that all obstruction is completely removed and to draw off any water that may be there.

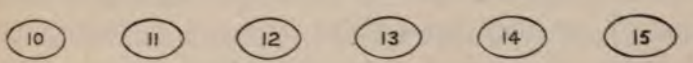
Fig. 18.

Fig. 19.

It will be seen that by this instrument the urethra is divided at the strictured spot in two places instead of one. I believe this will be found to be an advantage, inasmuch as contraction is less likely to follow where we have two longitudinal intervals in which healthy repair is allowed to take place. To maintain the interval made by the urethrotome until such time as cicatrization has been accomplished, I employ in the subsequent treatment of these cases oval-shaped bougies.

The incisions that are made by the urethrotome are as repre-

sented in this sketch.  My object is to open up these incisions and maintain them patent, so that when cicatrization is completed, the section of the urethra, if put on the stretch, would be thus  To effect this, after division by the urethrotome, I employ oval-shaped bougies, sections of which are here represented, by means of which dilatation of the urethra in a lateral direction is specially maintained :



In the largest sizes the circumference of the bougies gradually diminishes towards the handle, so that the meatus of the urethra is not kept continuously on the stretch whilst they are being introduced.

So far as I have practised this mode of treatment, I have every reason to be satisfied with the result; time, however, must elapse before any advantages it may possess can be properly estimated.

Whatever instrument we may select for the performance of this operation, there are certain conditions or rules to be remembered which are essential to its safety and success. First: we must take care that complete division of the contracted part or parts of the urethra can be effected. I have seen internal urethrotomy resorted to in a case where the mass composing the stricture was so extensive as to be amenable solely to perinæal section. Under such circumstances failure could alone be anticipated. Second : the operation should not be performed where there is any active suppuration going on in the

urethra. Apart from the risk of incurring septicæmia, we are desirous that the incision made should heal as kindly as possible, and without the intercurrence of that which interferes with healing, viz., active inflammatory action. Mr. Lund lays considerable stress on this point in his very interesting essay on internal urethrotomy.* Third: immediately after the operation (for which an anæsthetic should be administered) a full-sized catheter should be passed, and the bladder emptied, so that the patient will not be under the necessity of passing water for some hours. This allows the wound to become glazed over, and often saves the patient from a rigor on the first occasion of urinating. The risk of hæmorrhage has been advanced against internal urethrotomy. I may add, that where the operation is done with an instrument such as the one I am using and have described, no apprehension of this need be entertained, inasmuch as, instead of dividing the urethra pretty deeply in one place, the same effect is produced by a more limited incision at two points of the circumference. I do not commence the introduction of bougies until four or five days from the time of the operation have elapsed, and this I usually continue up to numbers 14 and 15, so as to make sure that the incisions are fully opened up.

Before concluding this lecture, I should like briefly to notice a mode of treating strictures which, though differing materially from what has just been described, has been very extensively practised. I allude to Holt's operation. The details of this operation are so well

* Lund, *On Internal Urethrotomy*.

known that I need not trouble you with them. The chief objections urged against it are that the urethra is torn, and frequently at its weakest spot in the strictured circumference, and that thereby the amount of cicatricial material is considerably increased. Hence, if the symptoms of stricture return, or rather are allowed to return, they are of greater severity and more difficult again to treat. There may be some amount of truth in these allegations, but I think the objections to the operation have been greatly exaggerated. I have practised the operation on something like seventy cases. I never met with any difficulty in performing the operation; I have never had a fatal result; it has never been followed by serious hæmorrhage or other serious distress, such as extravasation of urine; and though I cannot speak as to the ultimate results in anything like the majority of my cases, I know of many patients upon whom I operated eight and ten years ago who are living in complete comfort, and to all intents and purposes are rid of those urgent symtoms which necessitated this mode of treatment. Like many other surgical operations, it is frequently brought into discredit by disregard of those very conditions upon which its success entirely depends.

Post-mortem examination has shewn that two different results may be obtained by this operation. In the *British Medical Journal*, of July 17th, 1869, Mr. Christopher Heath mentions two cases operated upon in this very way, where, though the strictures had been completely removed, the mucous membrane remained intact. These undoubtedly were instances of submucous

stricture, where the obstruction was situated around the mucous membrane, just as Benjamin Bell describes, as if a string had been tied around the urethra. At a meeting of the Lancashire and Cheshire Branch of the British Medical Association, held at Preston, in 1870, I shewed the urethra of a patient upon whom Holt's operation had been performed shortly before death. I am indebted to Dr. Lyster for the specimen and particulars of the case. The operation was performed under particularly urgent circumstances by Dr. Lyster, and it in no way appeared to contribute to the death of the patient, who was suffering from a dropsical affection. On opening the urethra, the stricture was found completely split, including the mucous membrane, commencing rather in front of the stricture, and extending backwards somewhat obliquely to one side.

These two sets of illustration show us what is actually done in Holt's operation. If we could limit it to the first class of cases, viz., submucous strictures, the operation would, in every respect, be a success, inasmuch as we should reserve the cases where the mucous membrane is in itself implicated, either for dilatation or some form of urethrotomy. In practice we are able, to some extent, to give effect to this distinction, and when this can be done, cases of submucous stricture may advantageously be submitted to Holt's operation.

Where we have more strictures than one, and the case is further complicated with false passages, I have frequently performed Holt's operation, in preference to

any other mode of treatment, with the best results. Though internal urethrotomy has been brought to great perfection, and is now practised with precision, I am not prepared to admit that it should supplant an operation which, in properly selected cases, gives such good results as that generally known as the "immediate method."

TWELFTH LECTURE.

FOREIGN BODIES IN THE URETHRA AND BLADDER—ACTION OF URETHRA — ILLUSTRATIVE CASES—USE OF THE LITHOTRITE AS AN EXTRACTOR — FOREIGN BODIES IN THE FEMALE BLADDER.

THROUGH accident, or by design, foreign bodies occasionally become lodged within the urethra or the bladder.

Amongst the miscellaneous articles that have been found in one or other of these positions, I can recall to mind pins, needles, wires, a lucifer match, a knitting needle, a slate pencil, a feather, a bulb-headed grass, pieces of catheters and bougies, a whole bougie, and a pencil case; but, taking the experience of others, this repertoire might, I expect, be considerably extended.

Most of these have been introduced for the purpose of acting upon the penile portion of the urethra—for reasons often best known to the patients themselves—and, having slipped from their grasp, have made their way into the bladder. You will find, on referring to the second volume of the *Lancet*, for 1866, a correspondence between Sir Henry Thompson and Mr. Christopher Heath bearing upon this subject, the latter stating that "I have noticed in perfectly

healthy urethras that there is a constant vermicular contraction of the wall of the canal, apparently passing towards the bladder; and this accounts for the well-known fact that foreign bodies in the urethra tend to pass in that direction." Sir Henry Thompson, on the other hand, maintained that the vermicular movement "is precisely in the opposite direction; and also that foreign bodies have a strong tendency to pass outwards to the meatus, and not inward to the bladder."

My own impression is that the vermicular action of the urethra is an ejaculatory one, and that a foreign body is only forced in a direction towards the bladder when, in itself, it presents some obstacle to its passage outwards. A piece of bougie placed within the urethra, with its anterior extremity broken and uneven and its posterior end smooth, is sure by vermicular action to be forced in a direction *towards* the bladder by the very efforts that are made by the urethra to ejaculate it. Just as when the movements of the intestines are interfered with by a portion of the gut becoming strangulated, the contents of the canal are, by vermicular action, thrown backwards, instead of being propelled in a direction onwards to the natural outlet.

I will proceed to narrate some cases where foreign bodies have been passed into the urethra, as serving to illustrate certain points in practice which they suggest.

In 1861, Mr. Stubbs saw a youth, æt. 16, who was suffering from some induration in the ischio-rectal fossa and

perinæum. On enquiring into his history he found that eighteen months previously the patient had passed into his urethra a good-sized needle, which, having slipped from his grasp, disappeared. Not liking to mention it to any one, he had refrained seeking surgical advice. He appears to have suffered very little inconvenience from his accident up to within a week of his being seen, when he had some pain about the perinæum and difficulty in micturition. As fluctuation could be felt in the ischio-rectal fossa, an incision was made, and some matter evacuated, but no needle could be felt. Mr. Stubbs introduced his finger into the rectum, where he could distinctly feel the sharp point above. He then incised the perinæum in the median line, and withdrew the needle represented in Figure 20.

Fig. 20.

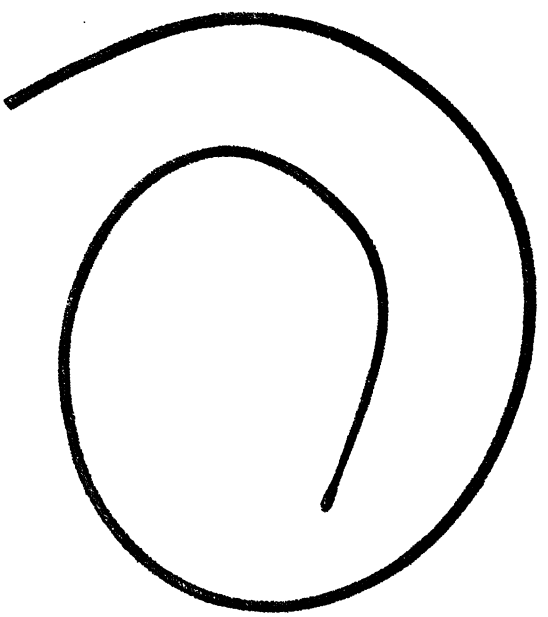
The patient recovered rapidly from the operation, and the opening entirely closed, no urine escaping through it. The needle was more than half covered with a deposit of lithic acid. (This specimen is amongst the calculus collection in the Museum of the Liverpool Royal Infirmary School of Medicine.)

The needle appears to have been introduced with the blunt end first, and so to have made its way into the bladder, where in the course of time it became largely coated with calculous deposit. Escaping from the bladder, it became lodged in the perinæum, and was extracted in the manner that has been described.

It is interesting to observe the calculous incrustation that took place on it, as explanatory of the formation of stone,* it not unfrequently happening

* In the Museum of the Royal College of Surgeons is a calculus (A 126) from the human bladder, having a slender piece of steel for nucleus. In reference to

1



2

3

that it is in this way a calculus is formed. We have numerous instances of this. In one case where I performed lithotomy, the nucleus turned out to be a piece of bone. Mr. Wilkes, of the Salisbury Infirmary, records a case of the same nature in Part 45 of the *Proceedings of the Royal Medical and Chirurgical Society of London*, which presents special points of interest.

In 1865, Mr. Stubbs removed, at the Royal Infirmary, an urinary calculus from the bladder, the nucleus of which was a piece of bougie about one inch in length; in this case, curiously enough, there were no symptoms whatever of stone in the bladder. The patient was suffering from stricture of the urethra, for the relief of which perinæal section was decided upon. Mr. Stubbs performed the operation in the usual way, and on an instrument being passed into the bladder a stone was felt, and without much difficulty removed through the perinæal wound. The patient had been in the habit of introducing a bougie, and remembered, three months previously, a piece breaking off; but as no untoward symptom resulted, he thought nothing further of it.

On Plate B, Figure 1, is represented a phosphatic calculus, from the Museum of the School of Medicine, the nucleus of which is a piece of metal.

Amongst the more remarkable objects that have found their way into the bladder is a bulbous grass.

the specimen the catalogue contains the following note :—"The deposit of uric acid, or any other substance except the earthy phosphates, upon foreign bodies in the bladder, is exceedingly rare."

This case came into the Royal Infirmary in 1865, under the care of Mr. Long. The patient supposed that he was suffering from stricture, to remedy which he was in the habit of passing different materials into his urethra. On this occasion he selected the ear and stalk of one of the grasses, which was introduced readily enough, but could not be withdrawn. Further efforts on his part only made matters worse, the ear being forced from the urethra into the bladder. When admitted into the Infirmary, shortly after the accident, he was suffering from most acute cystitis. A lithotrite removed a portion of the grass-head, slightly covered over with phosphates. The symptoms, however, were not abated, and death resulted. On opening the abdomen there was general peritonitis, the viscera being either coherent or coated with a layer of lymph. Within the abdominal cavity were four or five pints of turbid serum, which exhaled an ammoniacal odour. Upon examining the bladder, a large head of one of the grasses, covered with phosphatic deposit, was found impacted within it.* The stalk, which was stiff and resisting, had made its way through the fundus of the bladder, and protruded into the peritoneal cavity. The pelvic cellular tissue was infiltrated with purulent matter, having an urinous odour. The inflammation extended up the ureter to the pelvis of the kidney.

The history of the case was not obtained without

* What I have described as a "grass-head," Dr. W. Carter, the Lecturer on Materia Medica at the Liverpool School of Medicine, kindly informs me is the spikelet of the meadow fox-tail grass (*Alopecurus pratensis*).

PLATE C

considerable difficulty, and what had actually been inserted into the urethra was almost a matter for speculation, which the introduction of the lithotrite only incompletely determined.

The sketch of this exceedingly interesting case (Plate C) is from the specimen in the School of Medicine Museum.

A somewhat similar case is recorded, where Mr. Heath, of Manchester, removed by lithotomy about three inches of the stem of a sage-plant, with a thick coating of triple phosphate at the distal end. *

The next specimen I will shew you is a needle, armed with a knob of sealing-wax, which was passed into the urethra, for some imaginary complaint, by a young gentleman, and ultimately made its way into the bladder. After remaining there for some twenty-four hours, it appears to have been forced out into the perinæum, from whence it was removed through an incision, by Mr. Swinden, of Wavertree, who kindly presented me with it. The sketch (Plate B, Figure 3) represents its actual size, from which it will be seen that it measures nearly three and a half inches in length.

In 1864, a case was related by Mr. Hamilton, at the Liverpool Medical Institution, where, at the Southern Hospital, he had removed from a man's bladder portions of calculous concretion formed on a feather, which had been passed by the patient for the relief of a stricture. Here lithotomy was performed, as, from the nature of the stricture, lithotrity was impossible.

* *Manchester Medical and Surgical Reports*, vol. ii.

I will now pass on to notice two foreign bodies which I removed from the bladder by means of the lithotrite, and which testify to the value of this instrument under such circumstances. I am indebted to my dresser, Mr. I. Holmes, for the notes of this case.

W. O—, æt. 38, a militiaman, was admitted into the Liverpool Royal Infirmary on May 22nd, 1877. His statement was to the effect, that on the previous night, when under the influence of liquor, a pencil-case had been introduced up his urethra by a prostitute, in whose company, together with others, he had been. He did not appear, however, to have discovered anything amiss till the following morning, when certain uncomfortable sensations in the region of his bladder made him come to the conclusion that the lost pencil must be there. From his manner I was first inclined to think that the man was insane, but on hearing that the surgeon of his regiment had discovered the existence of a foreign body in his bladder, and had sent him to the Infirmary, I at once proceeded to examine him.

Upon examination, the foreign body appeared to be lying obliquely in the bladder, and partly within the prostatic portion of the urethra. I first attempted to remove it by means of the extractor, which is described in Reliquet's *Traité des Opérations des Voies Urinaires*, and known as the instrument of Messrs. Robert and Collin, but failing, a lithotrite was passed. By this the pencil was carried on completely within the bladder, where it was seized transversely. In this position it was impossible to extract it; however, by gradually rotating the lithotrite toward one side, whilst the pencil was kept within the blades of the instrument, I succeeded in reaching one end,

Fig. 21.

when the pencil was removed, point foremost, without any

further difficulty or damage to the urethra. The exact size of the pencil-case is represented in Figure 21. The patient was placed in bed, and a linseed poultice applied over the abdomen. During the afternoon and night he passed urine naturally, and on the following day he appeared in no respect the worse for what had been done. He was kept in the Infirmary until the 24th instant, when he went out on leave, but did not return.

Referring to the manipulation employed in extracting the pencil, I should say that similar means had been successful in another case which had come under my notice only a short time previously, where I had succeeded in removing from the bladder a piece of gum-elastic bougie which had been accidentally broken in the urethra. In the instance I have just recorded the extractor failed, because at first the pencil was firmly impacted, and therefore could not be made to rotate. Had I not succeeded with the lithotrite, I should have had recourse again to the extractor, which would then have probably been successful, inasmuch as the pencil being now fairly within the bladder, rotation would be permitted. The difficulty in removing foreign bodies from the bladder, such as pieces of bougie, is due to their being generally seized by forceps or the lithotrite transversely. This Messrs. Robert and Collin have endeavoured to remedy by the use of an instrument something like a lithotrite, the blades of which are so arranged that on seizing a body, such as a piece of bougie, it is rotated, and its long axis made to correspond with the urethra. The instrument is shewn here from Reliquet's work, to which allusion has already been made. (Fig. 22.)

Fig. 22.

The last case of this kind to which I shall refer is one where, by means of the lithotrite, I removed from the bladder of a middle-aged man, a No. 3 bougie, twelve inches in length. The bougie had been introduced by a surgeon as a conductrice to a urethrotome, in a case where it was intended to divide a stricture by an internal section. Unfortunately the bougie separated from the urethrotome just beyond the point where it was attached by means of a screw. The surgeon at once ruptured the stricture by Holt's method, and left the bougie in the bladder for extraction on a future occasion. I saw the case fourteen days after the accident. As the urethra would by this time admit a No. 12 bougie, I had no difficulty in introducing the lithrotrite and extracting the bougie. This I seized about the centre, and brought it out doubled; it being soft and of small size, the operation was accomplished without any force being exercised. The patient recovered without a bad symptom. The bougie appears to have remained in the bladder curled up in the manner shewn in the drawing. (Plate B, Figure 2.) No calculous deposit was observed upon

it, although it had been in the bladder for a fortnight.

This case points to the care that should be exercised in properly securing the connecting links between the urethrotome and the conductrice. Additional means of security have, I understand, been taken in the making of the kind of instrument which was used on this occasion, to obviate the occurrence of such an accident as I have described, which might have given rise to much more serious consequences.

Mr. Lund, of Manchester, records a very similar case, where he removed a bougie from the bladder by the lithotrite. In this instance, also, it was complicated with stricture, for which Holt's operation was performed previously.*

The female bladder is also occasionally found to contain various foreign bodies.

Some years ago, by means of a pair of narrow dressing forceps, I removed a bodkin, which had been introduced by the patient, it was alleged, for the purpose of extracting a piece of gravel from the urethra.

A remarkable case of this kind was narrated by Dr. Grimsdale, at the Liverpool Medical Institution, in 1865, where he had removed a calculous concretion, formed on a large hair-pin, from the bladder of a young lady, aged fifteen years. Removal was effected by rapidly dilating the urethra with a Weiss's dilator, and extracting the foreign body with forceps. On the second day after the operation she was able to pass

* *Liverpool and Manchester Medical and Surgical Reports*, 1873.

water voluntarily; recovery followed, the patient possessing full power over the bladder. In this instance there was some tumefaction above and to the left side of the symphisis pubis, as if an abscess were impending. It is probable that the foreign body might have been expelled in this way had not its removal been effected by surgical interference.

The Museum of the School of Medicine also contains a hair-pin (E 22), which was removed by Mr. Bickersteth, by rapid dilatation, from the bladder of a female.

As in cases of stone, operations on the female bladder where the urethra is incised, are apt to be followed by incontinence of urine, rapid dilatation of the urethra should be employed for all small bodies. Where the calculus, or foreign body, is too large for extraction entire in this manner, lithotrity may be advantageously combined.

THIRTEENTH LECTURE.

HYPERTROPHY OF THE PROSTATE — RETENTION OF URINE — VARIOUS CIRCUMSTANCES UNDER WHICH RETENTION OCCURS — TREATMENT — INCONTINENCE OF URINE — FORMATION OF CALCULI.

IN treating of enlargement of the prostate gland, I shall confine myself as much as possible to noticing that symptom which, as a rule, first brings the patient to ask your assistance, and, of all others, is the one most productive of distress; I mean, retention of urine.

Unlike those other urethral obstructions which have received our attention, this is a disorder which, as a hypertrophy of the gland, is only met with in advancing years, as it rarely happens to a person under fifty-five years of age.

As impeding micturition, it usually does so in one or other of the following ways:—(*a*) temporarily arresting it; (*b*) partially arresting it; (*c*) completely arresting it. To study these conditions from a clinical point of view, let me take an ideal case, and trace it through these three stages, and I will endeavour to do so in such a way as to enable you to apply the description to actual cases you have seen in my wards, and upon which I have commented at the bed side. I

do not wish it to be understood that all cases of prostatic hypertrophy in their symptoms follow the succession I have taken; one or other may alone be met with, or even the last of the series of events I have sketched may be the first indication of what has gradually been taking place.

A patient of somewhat advanced age who, from time to time, has experienced various slight annoyances in connection with his urinary apparatus, after some indiscretion, such as exposure to cold or an indulgence in wine, finds himself completely unable to pass water. You are summoned urgently to him, and find, after an examination, that he is suffering from an enlargement of the prostate. You relieve him with a catheter, selecting for this purpose —not the ordinary instrument, but one considerably longer and more curved. Even in introducing this, you find a hitch as it approaches the prostate, to overcome which you introduce your finger into the rectum, for the purpose of giving it a "tilt" to help it over the obstruction. The symptom of retention is at once relieved, and possibly on the following day the patient again passes water as usual, or the retention remains, and some days, or even a week or so, may elapse before he is able to dispense with the assistance of the catheter. Now, what has happened? Clearly it is not all due to the enlargement of the prostate, or the inability to urinate would be permanent. Superadded to a prostate, which is gradually enlarging, you have prostatic hyperæmia, or paralysis of the bladder, either of which conditions might be brought about by the

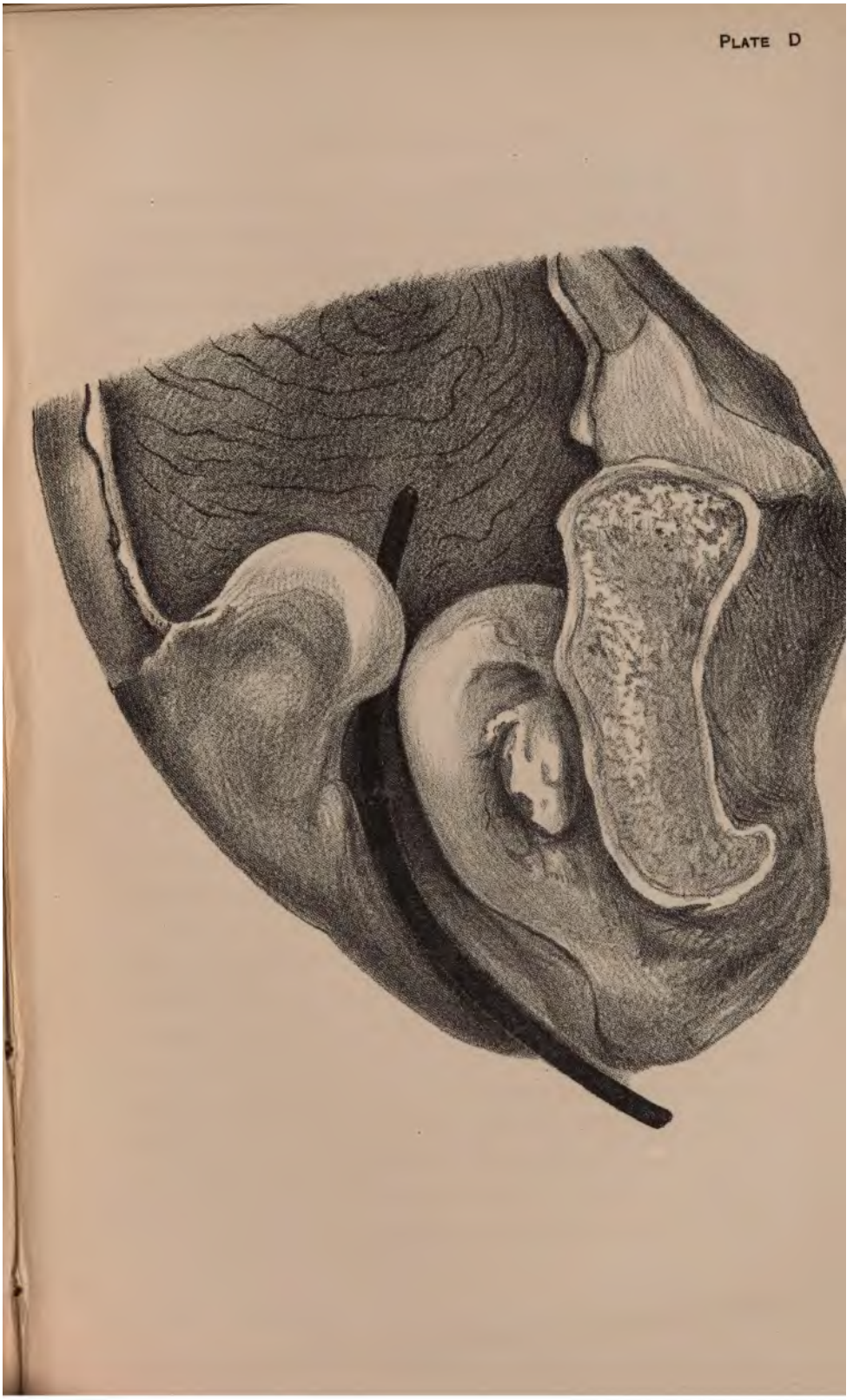
excesses to which I have alluded. If the former, the introduction of the catheter, even with the most delicate touch, is occasionally followed by more or less hæmorrhage as the instrument passes over the obstructed part of the canal. The hæmorrhage, under these circumstances, seldom does harm, and the patient is soon able to pass urine again. In cases of prostatic enlargement with hyperæmia, you usually have other indications, such as frequent and painful erections. If the cause of the retention is paralysis of the bladder, due to over-distension, probably some days or even weeks may elapse before you are able to remedy this; and to remedy this we employ, at regular intervals, catheterism. I much prefer, where it can be done, passing the catheter to the retention of anything within the bladder, by which the urine can be run off as it is collected, as cystitis is frequently produced by retained instruments. Added to catheterism, we may employ internally such remedies as strychnia, nux vomica, and iron, with the view of restoring the natural tone of the bladder.

After the patient has recovered from this temporary attack of retention, though not free from slight urinary troubles, a considerable interval may elapse before your services are again required. He may now come to you and say that he seeks your advice under very different circumstances. On the former occasion it was to relieve his retention; now, as it appears to him, it is for a very opposite condition,—he is always making water. His days are disturbed and his nights are broken by a constant

desire to empty his bladder. Further than this, he complains that frequently his urine emits a very unpleasant odour. Founded upon your examination, and strengthened by the inference that if a man is constantly wanting to expel something, there must constantly be something requiring expulsion, you come to the conclusion that the bladder is now never emptied. Acting upon this, you propose to the patient to test its correctness by passing a catheter. He may possibly regard your proposal as very unnecessary, as he is disposed to think that he passes too much water rather than too little. Still, however, he submits, and you find that though he only micturated ten minutes before your interview with him, some urine is left in the bladder. The fact is, that by the growth upwards of the prostate, the outlet of the bladder is above the water level. You may possibly be able, should further proof be wanted, to convince the patient of this, by asking him, after he has made water in the usual position, to endeavour to do so with the pelvis raised—placing him on his hands and knees—when more urine escapes.

The condition I have just described is well illustrated in Plate D. Such being the state of affairs, viz., that the outlet is above the water level, what is the remedy? Clearly the remedy is a mechanical one, and we must have resort to some artificial means of emptying the bladder, otherwise the urine, being stagnant, will decompose, and cystitis be added to the existing distress. My views as to the management of the patient under these circumstances are so in

PLATE D



accordance with those of Van Buren and Keyes* upon the point, that I shall quote the following paragraph: — "The question now naturally arises, Is it advisable to instruct a patient with enlarged prostate in the use of the catheter, if he has a very small amount of residuum or none at all? Most assuredly, Yes. If there is no residuum, still, with the slow advance of the disease, a time is pretty sure to come when there will be a certain quantity, or when, from the effect of cold, irritating urine, or other cause, retention may come on. It is a rule with no exceptions, that a patient with hypertrophied prostate is never safe unless he can pass a catheter for himself, any more than is a patient with hernia who does not wear a truss. Hence, in all cases, the patient should be taught the use of a soft catheter, be provided with an instrument, and instructed in the manipulation of washing out the bladder, both for purposes of cleanliness and so as to be enabled to employ medicated injections. If the amount of residuum is small, so that no material relief is afforded by the mere draining off of the urine which the patient cannot pass, still the force of the above reasoning is applicable, and the utility of washing out the bladder is equally necessary, since the liability to the formation of stone exists as well where the residuum is small as where it is large."

Where, then, we have residual urine, the catheter should be employed at least once in the twenty-four hours, and where there is any indication, from the

* *Genito-Urinary Diseases*, p. 196.

smell, appearance, or reaction of the urine, that decomposition is taking place, the additional precaution of washing out the bladder should be taken. This latter operation will be further noticed in speaking of the treatment of cystitis. It is often remarkable to notice how dexterous a patient will become in the use of the catheter. Even elderly persons, when they have once gained confidence, often become most expert operators, and take considerable interest in the management of their own case, when you have clearly explained to them the object of your treatment, and they learn from experience the relief that is afforded.

We will now proceed to consider what I have taken as the third and often last phase of the disorder, namely, where retention of urine is complete. When the prostate gland has enlarged to such dimensions as to offer an obstacle—and sometimes an insuperable one — to the escape of urine from the bladder, there is no difficulty in making the diagnosis; in addition to the age of the patient who is the subject of retention, digital examination of the rectum usually reveals the state of the gland. In some instances it has attained enormous dimensions; I have seen it larger than the fist, and sufficient during life to exercise pressure upon the rectum, and so impede defæcation.

The enlargement most frequently involves that portion of the gland known, from the days of Sir Everard Home, as the third lobe, the effect of which is, as you see from Plate D, to elongate the urethra, and to obstruct the free outlet of the urine from the

bladder. I mention these two points particularly, as explaining why we use a longer and differently shaped catheter when relieving retention thus caused.

When retention occurs, and this may happen without any premonitory symptoms, it is the duty of the surgeon to attempt catheterism. For this purpose I generally select a No. 8 gum-elastic catheter, three or four inches longer than that required for retention arising from stricture in other parts of the urethra. I again refer to the length of the instrument, as I have seen two or three instances where surgeons have failed to relieve retention, not from making false passages, but simply because their catheters have not been sufficiently long. Some surgeons prefer the French gum-elastic prostatic catheter, where the point is permanently fixed at a suitable angle. (Figure 23.) When

Fig. 23.

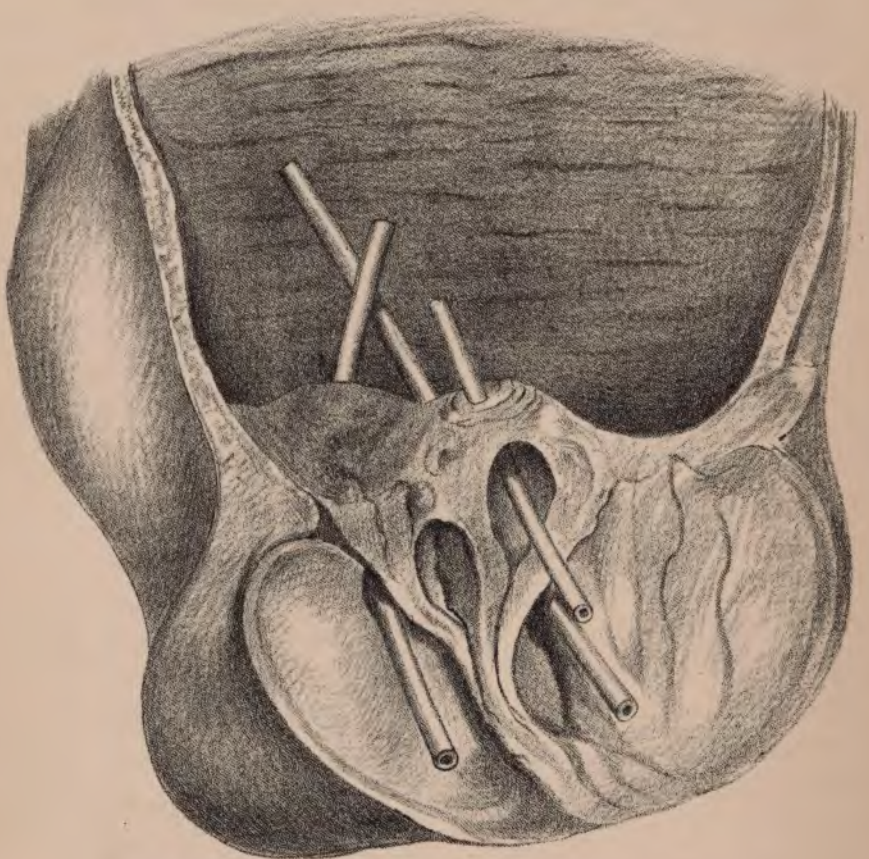
the prostate is reached, assistance may often be rendered by the finger in the rectum, in tilting the end of the instrument over the obstruction; or, again, the expedient of passing down a stiff stylet, bent at an angle, along the catheter, is often successful in causing the point to surmount the enlarged lobe, and so to enter the bladder.

The extent to which the bladder may be distended in cases of enlarged prostate, is often very remarkable. Several quarts of urine have been removed at a sitting, and the question as to whether the case is one of

ascites or bladder-distension has arisen. In cases of largely distended bladder in enfeebled persons suffering from prostatic enlargement, it is a consideration whether the whole of the urine should be removed at once. Where the distension is great, for instance, when the collection amounts to several pints, I entirely agree in the opinion of many eminent surgeons in saying that it is better not suddenly to empty the bladder. In practice, however, in our desire to give the fullest amount of relief, we may inadvertently disregard this precaution. The objections to the removal of a large quantity of urine are these: in an enfeebled person it is apt to be followed by syncope, or, as I have seen, when the distension is thus removed from off the blood vessels of the parts, passive hæmorrhage into the bladder and out through the urethra has been the consequence. Such a loss of blood has, in this way, been fatal in the course of a few days. These effects are similarly observed after the rapid removal of fluid from other parts of the body. Syncope, after tapping for ascites, is not uncommon, and in a case I recently saw, the withdrawal of the ascitic fluid was immediately followed by violent hæmatemesis, which was fatal in a few hours. The removal of the tension from off the abdominal blood vessels was the only explanation of this. The bladder is also more likely to regain its muscular power when it is gradually emptied than if it were suddenly reduced to a flaccid condition.

Hence it is a good rule, in the case of feeble persons who, for some days, have been suffering from retention,

PLATE E



and where the bladder is considerably distended, to draw off the urine by degrees.

The size and direction of the prostatic enlargement sometimes renders catheterism impossible, and then the question arises as to what is best to be done. Forced catheterism, by which is meant driving the instrument through the obstruction, and thus entering the bladder, is a means that has been advocated. In this specimen from the Museum (Plate E.) you will see that this has been done, and the prostate completely riddled with holes, as shewn by the pieces of bougie which have been introduced through several of the false passages. Though here the proceeding appears to have been, for a long time, practised with impunity, it is not to be recommended, inasmuch as, apart from the hæmorrhage and other damage it may occasion, it is calculated, from the force necessary, to set up inflammation around the gland, as I have seen in two instances, where this operation was followed by fatal pelvic cellulitis. In a case where there was this difficulty, I tapped, with the aspirator, above the pubes; the distension being removed, I was subsequently enabled to employ catheterism in the usual manner. Aspiration may be repeated almost indefinitely, a case in point being that to which I have already alluded. When narrating his experience of aspiration, Mr. W. Brown, of Callington, says:—"We used the aspirator daily, and on some occasions the pain was such as to require the operation to be performed twice in the day. Altogether we performed the operation fifteen times, with immediate relief on every occasion,

and without the smallest inconvenience or injury from the punctures or perforations of the needles."*

Where, from the extreme irritability of the bladder, associated with an enlarged prostate preventing catheterism, it is necessary to maintain a more permanent escape for the urine, I should advise tapping the bladder above the pubes, and inserting some form of self-retaining elastic catheter. The convolvulus catheter of Napier can be made to answer this purpose admirably.†

For retaining in the bladder we have a variety of india-rubber instruments, armed with suitable projections. Amongst the best of these may be mentioned Mr. Barnard Holt's winged catheter.

The objection to these instruments is that in themselves they often act as causes of cystitis or irritation, but inasmuch as unhealthy urine is a greater source, it is necessary to select the lesser of the two evils, remembering that the irritation produced by a retained cathether can generally be reduced to a minimum by the employment of scrupulous care and attention in washing out the bladder, and removing all extraneous sources of inflammation.

We must not forget that what is called "incontinence of urine" almost invariably indicates that the bladder is full—so full that it is actually overflowing—and requiring for its relief the same treatment we employ for retention.

* *British Medical Journal*, May 23rd, 1874.

† The description of this instrument, and its application for the removal of small calculi from the bladder, will be found in the *Medical Times and Gazette*, of June 14th, 1873.

Prostatic enlargement, by inducing those changes in the urine to which allusion has already been made, sometimes leads to the formation of a calculus, the symptoms of which are obscured by the original disorder. Further than this, the hypertrophied prostate, by concealing the stone behind it, has prevented its detection by the sound, as the accompanying sketch (Plate F.), from a specimen in the Museum, shews. It is a good rule, in cases of hypertrophied prostate, to take an opportunity of carefully exploring the bladder with a sound, not forgetting to sweep round the depression which is always found behind the enlarged gland. (Plate D.)

I shall, on a future occasion, have an opportunity of making some further observations on the use of the sound in the diagnosis of stone.

FOURTEENTH LECTURE.

CYSTITIS — VARIOUS CAUSES — CHRONIC CYSTITIS — CATHETERISM — WASHING OUT THE BLADDER — THE PESSARY-CATHETER — TOPICAL APPLICATIONS TO THE BLADDER — ATONY — PARALYSIS — CYSTITIS IN FEMALES.

CYSTITIS, or inflammation of the bladder, is an affection which you frequently have an opportunity of seeing in the surgical wards, occurring rarely as an idiopathic disorder, but commonly in connection with some other derangement of the urinary system. I purpose, first, to consider the ordinary forms of this disorder, and in doing so I shall endeavour to classify the circumstances under which they arise.

(*a*) As produced by the extension of inflammation from some other part, as in gonorrhœa. This may be called metastatic cystitis.

(*b*) As a consequence of obstructed micturition, as in stricture or hypertrophy of the prostate. The cystitis of obstruction.

(*c*) As produced by an irritant in the bladder, such as a calculus or a growth. The cystitis of direct irritation.

It is not uncommon to find cystitis in various degrees occurring as a consequence of gonorrhœal urethritis. It is generally considered to be an

extension of the inflammation to the mucous membrane of the bladder along the urethra; like other inflammations designated "metastatic," I have noted that the primary disorder often abates as the change in locality is effected, as if the force of the action were concentrated on one spot.

In the slighter forms of cystitis, as a consequence of gonorrhœa, we have the complication indicated by frequent micturition and urine loaded with mucus. In the severer forms the bladder is intolerant of the presence of urine within it, as indicated by the extreme frequency of micturition, and the distress and tenesmus produced by the contractile power necessary to expel it. The urine becomes purulent, and a discharge of blood not unfrequently terminates the act of micturition.

The treatment of this form of cystitis must be in correspondence with the degree of inflammatory action that is taking place. In the milder forms, where the term "irritation" best describes the extent to which the bladder is implicated, the suspension of any form of abortive local treatment, so far as the gonorrhœal discharge is concerned, is at once necessary. Rest in the recumbent position, and soothing applications in the shape of sedative suppositories and fomentations, must be substituted. Of all the demulcents I have been in the habit of prescribing, I find the decoction of the ulmus fulva, in combination with the succus hyoscyami, affords the speediest relief. In the acute forms of cystitis antiphlogistic means will, in addition, be required. Nothing soothes the patient who is suffer-

ing from an acutely inflamed bladder more than the local abstraction of blood. A few leeches applied to the perinæum speedily removes that dreadful feeling of tension about the neck of the bladder which is always more or less complained of. As the acuteness of the disorder abates, buchu and uva ursi are usually administered with the best results.

For the treatment of cystitis reference is often made to the reaction of the urine as indicating the necessity of administering either acids or alkalis. On this point I may say that our object should be to obtain that condition of the excretion which most nearly corresponds with its normal state as being the least likely to provoke irritation. I mention this, as we sometimes find that alkalis are poured in with a vigorous hand, and quite regardless of the fact that healthy urine almost invariably has an acid reaction.

In cases of gonorrhœal cystitis, where the disorder has a tendency to become chronic, frequency in micturition and purulent urine remaining after the other acute symptoms have subsided, I have found benefit from the use of copaiva, or the oil of sandal-wood; these remedies, however, are not well borne where there is general febrile disturbance.

The cystitis of obstruction (*b*) is caused by the decomposition of retained urine, and consequently occurs in cases of organic stricture of the urethra, of enlarged prostate, and of paralysis, where urine is allowed to remain in the bladder and become chemically changed.

"The mode in which the urine becomes ammonia-

cal from decomposition is easily explained. One atom of urea, with two atoms of water, by a simple re-arrangement of their particles, becomes converted into two atoms of carbonate of ammonia; 1 at. urea $C_2 H_4 N_2 O_2 + 2 H.O = 2 (NH_3 CO_2)$. This change is so easily brought about, that mere boiling of a solution of urea in distilled water is sufficient to effect it."* The treatment of cystitis set up by decomposing urine resolves itself into the removal of the cause or the mitigation of the consequences.

In organic stricture this can generally be done by one or other of the methods of treatment which have already been described.

Where the obstacle to the natural discharge of urine cannot be removed, as in cases of enlarging prostate with residual urine, reliance must chiefly be placed on mechanical treatment, which includes the regular emptying of the bladder with the catheter, and its thorough cleansing by water or suitable medicinal agencies. For the purpose of washing out the bladder, you usually see me employ the very simple contrivance figured by Mr. Bryant, of Guy's Hospital.† A glass funnel, to which is fitted a couple of feet of india-rubber tubing, and a gum-elastic catheter, is all that you require.

On the catheter being introduced into the bladder it is connected to the funnel by means of the tubing. When the funnel is elevated, and water poured in, the latter, by hydrostatic pressure proportionate to the

* *On Urinary and Renal Diseases*, by Dr. W. Roberts, p. 55.

† *Practice of Surgery*, p. 501.

calibre and length of the tubing, is forced into the bladder; by lowering the funnel below the level of the patient, the water escapes from the bladder. In this way the viscus can be thoroughly cleansed in a very few minutes, and with little inconvenience to the patient.

Some surgeons use a double catheter, to which is fitted a gum-elastic ball or syringe; I prefer the

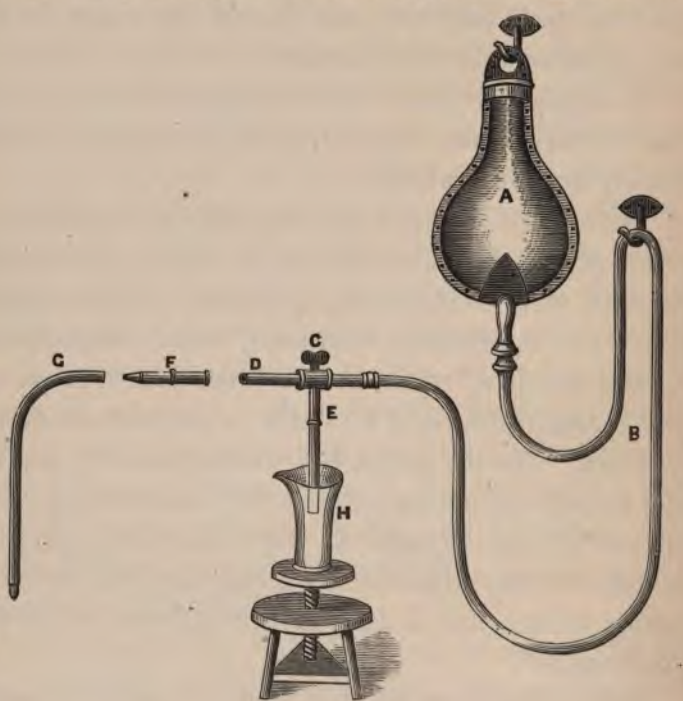


Fig. 24.

former plan, an experience which I find generally accords with the feelings of patients who have made a trial of both. Where it is necessary to perform this operation for some time, a modification of the funnel

arrangement may be recommended. My attention was first called to this contrivance by my friend Dr. Fifield, of Boston, and, as it is little known, a brief description of it may be useful. From the accompanying sketch (Figure 24) it will be seen that the apparatus consists of a vulcanized india-rubber bottle (A), capable of holding a pint of fluid, which, by means of a ring, can be suspended to any convenient hook; a piece of tubing, five feet in length (B), terminating in a stop-cock (C), which permits fluid to flow either through the catheter end (D), or the outlet pipe (E), according to the direction in which the tap is turned. A conical metallic catheter mouth-piece (F) completes the connection between the catheter (G). A soft rubber catheter is generally preferred. The instrument is used in the following way:—The bag, being filled with the fluid to be injected, is hung up about six feet from the floor. The stop-cock (C) is then turned until some of the fluid escapes, so that no air is allowed to enter the bladder. The patient, being in the erect position, then introduces the catheter and connects it with the tubing. By the alternate action of the tap (C) the fluid is made either to enter the bladder or to escape; if the latter, it passes into the receptacle (H). The instrument can be readily adapted to the recumbent position. Beyond other advantages I have found the apparatus possesses, it enables patients to perform this operation without the assistance of any one else.

In cases where there is hæmorrhage from the bladder, and the catheter readily becomes blocked up

with clots, I have on several occasions found Clover's apparatus for the removal of detritus after lithotrity of much service. This consists of a large-eyed catheter (with a bougie for a stylet), to which is fitted a gum-elastic bottle capable of injecting fluid with as much force as it would be, under any circumstances, desirable to use.

For bladder injections for cleansing purposes tepid water is generally employed; where, however, the urine remains in an unhealthy condition for some time, a few drops of nitric acid, or the tincture of perchloride of iron, may be added with advantage. To alleviate the extreme irritability of the bladder, which often remains after the more active symptoms of inflammation have passed away, a solution of morphia, injected into the bladder with a gum-elastic catheter, to which a ball-syringe is attached, often gives the patient a good night after rectum suppositories in various forms have been tried.

For a similar object, I am now employing in these cases vesical suppositories, containing morphia, belladonna, bismuth, and other soothing agents. I put these into the bladder by means of a pessary-catheter, which has been made for me by Messrs. Krohne and Sesemann. The instrument consists of a silver catheter, open at the end, in which the pessary is placed. By means of this instrument the bladder is first emptied of any urine it may contain, after which, by pressing the stylet, the pessary is projected into the bladder. The pessaries are made of the oleum theobroma, and are so shaped as to fit

in the open end of the catheter, thus giving it the appearance of an ordinary instrument, and facilitating its passage into the bladder. The shape of the pessaries is shewn in the sketch (Figure A); they contain various medical applications.* A grain of morphia, introduced into the bladder in this way, and repeated twice in the twenty-four hours, has, in several instances, completely and permanently relieved the most distressing symptoms of irritation. I have extended the application of these vesical pessaries to other cases, where astringent and direct application to the bladder are indicated.

Fig. 25.

Atony is a not infrequent consequence of the condition I have been describing. From over and long-continued distension, the bladder becomes a mere flaccid receptacle, and loses all power of expelling its contents. Much may be done to prevent this by the mechanical measures I have been advocating. In addition to these, medicines, such as iron, nux vomica, and strychnia, have been administered with varying success.

Dr. Glynn speaks very highly of the tincture of cantharides, given in twenty minim doses, in cases of paralysis of the bladder arising from affections of the

* These pessaries are made for me by Messrs. Symes & Co., Hardman street, Liverpool.

spinal cord; it is an old-fashioned remedy, which, in addition to its diuretic properties, probably exercises, as Dr. Glynn suggests, a direct stimulating action upon the bladder by its presence in the urine.

Recently, I see that Professor Von Langenbeck has found considerable benefit in these cases from the use of hypodermic injections of ergotine. "In all the cases (three) there was an immediate increase in the contractile power of the bladder, so that the patients passed more water than they had previously done; and, after a few days, the bladder had so far recovered its force, that scarcely any urine remained in it after micturition."* In two cases where ergotine has thus been tried, at my suggestion, the patients certainly appeared to gain muscular power; both of them suffered from impeded micturition, with considerable prostatic enlargement.

The last form of cystitis (*c*) I have here to notice, is that produced by an irritant within the bladder itself, such as a calculus or a tumor—causes which may or may not permit of removal. These, however, will be more conveniently considered later on in connection with the other symptoms, of which this may only be one.

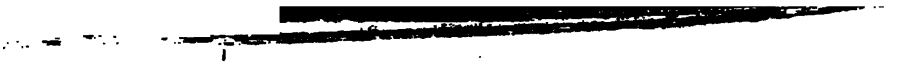
I need hardly remind you that there are causes of cystitis other than those I have enumerated, for the sake of convenience, in a tabular form. A paralysed bladder, as we see in disease and injury of the spinal cord, is, sooner or later, almost sure to become an inflamed one in the way that has already been

* *Medical Times and Gazette*, April 7th, 1877.

explained. In the surgical wards we find this in cases of fractured spine, where there is retention. Catheterism and washing out the bladder will do much towards mitigating the distress of the patient and averting a fatal issue; for where recovery has followed —as in those instances recorded by Mr. Manifold*— much of the success, I believe, is due to the absence of inflammation of the bladder. In employing catheterism in these cases, we should not forget that, owing to the absence of sensibility in the parts, much damage may be inflicted by an injudicious employment of instruments, without the patient expressing that consciousness of pain which otherwise he would do. The greatest care should consequently be exercised in drawing off the urine to avoid any laceration of the urethra or bladder, which, considering the state the urine is in, would be sure to provoke further complications. Almost the whole comfort of the patient suffering from a fracture of the spine depends upon the manner in which his urinary symptoms are anticipated and managed.

In the treatment of cystitis, as it occurs in females, you can have no better instructions than those contained in a very practical paper on this subject by Dr. J. Braxton Hicks.† The author points out how little is to be expected from internal remedies beyond correcting such abnormalities as are afforded by the state of the urine and the functions generally, and how much may be done by local treat-

* *Liverpool Medical and Surgical Reports*, vol. ii.
† *British Medical Journal*, July 11th, 1874.



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ment. Reliance is chiefly placed upon washing out the bladder with slightly acidulated warm water until it is clear of phosphates and mucus, and afterwards injecting, with the view of its retention, of a solution of morphia. Subsequently permanganate, or chlorate of potash, is employed in a similar manner. On the subsidence of the acuter symptoms, injections of tannin, or of perchloride of iron, followed by morphia, are substituted, and are again changed as the bladder becomes less sensitive for more potent astringents, such as the nitrate of silver. "The benefit of such management is very marked in cases of paralysis where, from retention or the rapid ammoniacal decomposition of the urine, the distress and constitutional irritation are very distressing; and thus we can often lessen the chance of the extension of the irritation to the kidneys. Again, in malignant disease, the simple injection of acidulated warm water gives amazing comfort, removing the phosphates and ammonia, and when to this is added the morphia, a wonderful comfort is felt. Indeed, so much relief is obtained, that with a large calculus in the bladder, its presence is almost entirely unfelt if morphia be daily injected." *

Dr. Hicks' paper is well worthy of perusal; its value is further endorsed by my friend Mr. Long, whose opinion, based on a large practical experience of the treatment of these affections, commands the highest respect.

* *Op cit.*, p. 30.

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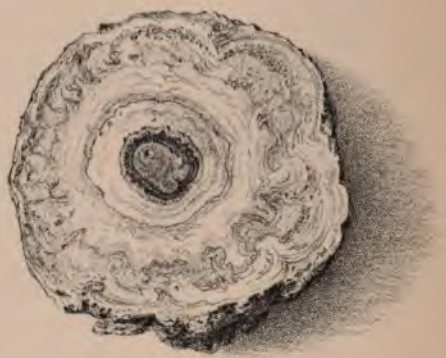

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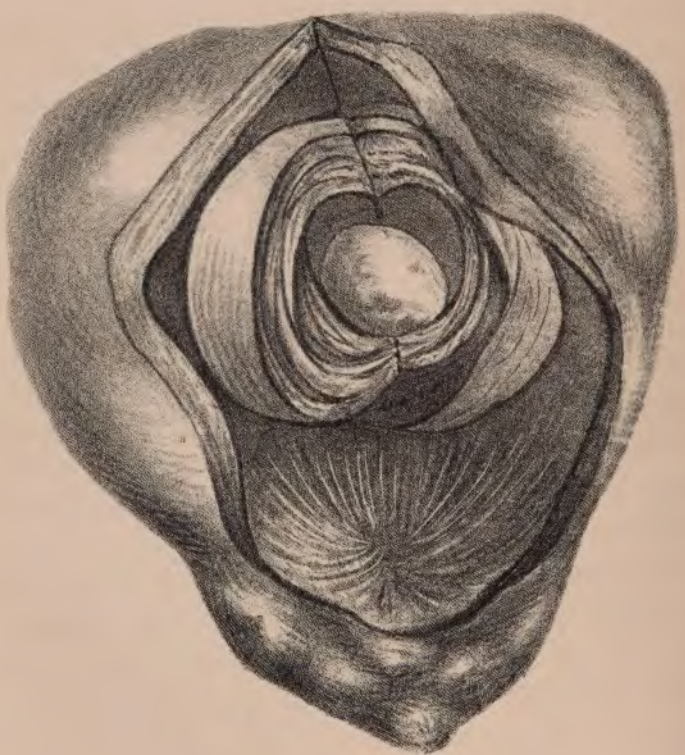

3

FIFTEENTH LECTURE.

Calculous Disorders—Calculus in the Kidney—Symptoms—Nephrotomy—Calculus in the Bladder—Sounding—Sources of Error—Calculus in the Urethra—Peculiarly Shaped Calculi.

In considering the disorders of the urinary system, there is no subject of greater interest to the practical surgeon than the treatment of the various calculous concretions which are met with in all parts of the tract, from the kidney downwards.

Calculous depositions, passing through the kidney, under the name of "an attack of the gravel," most frequently come under the attention of the physician; small particles of sand-like material, giving rise to irritation and severe pain, are discharged with the urine, and relief follows. Sould any of these particles be retained within the kidney, they may form the nucleus of further concretions, and produce symptoms requiring the attention of the surgeon.

A calculus such as this specimen (Plate G, Fig. 1), has evidently, from its configuration, been moulded within the kidney, inasmuch as we can trace on it casts of the uriniferous ducts. It is composed of uric acid, and weighs ten grains. For some time the

patient from whom it came had suffered from obscure renal symptoms, leading to the suspicion that a calculus was impacted in the kidney; a condition which has been described under the name of nephritic colic. Suddenly these indications became greatly aggravated; there was intense lumbar pain extending down the groin and thigh of one side, with retraction of the testis. Quite as abruptly as they commenced, in the course of a few hours of most excruciating suffering, these symptoms disappeared, and complete relief followed.

There could be no doubt that a calculus had passed from the ureter to the bladder.

A few days afterwards I sounded the patient, and detected the calculus I am now shewing you, in the bladder. I determined to crush it with the lithotrite, but on the day following my examination, the patient voided it per urethram, with some difficulty and pain. I mention this case not only as illustrating the symptoms which a renal calculus may cause, but as pointing to the importance of at once taking means to deal with these concretions when there is reason to believe they are still lodged in the bladder. For the removal of small stones, Napier's very ingenious convolvulus cathether might be tried.*

The relief that follows the escape of a calculus from the ureter into the bladder is so marked as to lull the patient into the idea that his troubles are now at an end; should, however, the calculus remain within the bladder, by its increase in size, it sooner or

* *Medical Times and Gazette*, June 14th, 1873.

later brings with it a fresh train of symptoms, indicating its altered position. A case similar to the one I have narrated, and shewing the advantage of early exploration and treatment, came under my notice a few months ago. A gentleman, after suffering a paroxysm of pain, evidently due to the passage of a renal calculus along the ureter, consulted me for persistent retraction of the testicle, with some tenderness. I introduced a lithotrite down the urethra, and could distinctly feel, on entering the bladder, that I had pushed back a small calculus; this I seized and completely crushed. The patient passed some few portions of a uric acid calculus, and suffered no further inconvenience.

Calculi impacted in the kidney sometimes attain a very considerable size, and usually eventually give rise to inflammation, suppuration, and disorganization of the affected organ. Such a case was under my care in No. 7 ward. The patient was sent to me by my friend Dr. Brice, then of the Cunard Service, who, having diagnosed the existence of stone in the kidney, thought that it might be possible to afford relief by operation. Unfortunately, however, the patient was in such broken health as to render any such course inadmissible. Dr. G. G. S. Taylor, who made a *post-mortem* examination after the patient left the Infirmary, was good enough to inform me that the right kidney was found completely disorganised, and contained a large quantity of calculi, varying in size from a pea to a hazel-nut. The left kidney was similarly affected, but to a less degree, thus confirming the view that

had been taken as to the uselessness of resorting to nephrotomy.

Here is another specimen (Plate G, Fig. 2), which was also removed from a patient of mine in the Royal Infirmary, who died shortly after his admission, without giving me the chance of affording relief by an operation, which some time previously might, I believe, have been performed with a fair chance of success. The operation of nephrotomy is not one that presents any peculiar difficulty, as the kidney can be exposed in the way employed for the performance of colotomy. You will find an instructive paper on this subject, by Mr. Thomas Smith, of St. Bartholomew's Hospital, in the *Medico-Chirurgical Transactions* for 1869.

A calculus impacted in the ureter may lead to complete atrophy of the corresponding kidney; such cases, however, are by no means necessarily fatal, inasmuch as the opposite organ compensates for the damage by adapting itself to increased work. There is an interesting case recorded by Dr. Newman,* where death followed suppression of urine which had existed for five days. At a *post-mortem* examination, symmetrical blocking of both ureters with calculi was found. This, of course, is a very unusual instance.

Passing to stone in the bladder, I may remark that the symptoms are generally such as to permit of but little doubt.

They may be briefly summarised as symptoms indicative of vesical irritation. There is usually frequent micturition, smarting at the end of the penis, and

* *British Medical Journal*, January 15th, 1876.

pain after the bladder has been emptied. In children, we often have the history of hæmorrhage, at some time, from the urethra; prolapse of the rectum and elongation of the foreskin, also commonly occur.

Conclusive evidence of a stone in the bladder can only be afforded by the sound.

The operation of sounding is one that we are all familiar with; care must be taken in persons of advancing years that the end of the sound is made to traverse all parts of the bladder, otherwise a calculus, by an abnormality of the prostate, may escape detection.

Various forms of instruments are used for sounding; I prefer a short curve, with a somewhat expanded extremity. Nearly all sounds have one very grave defect; they are made too thick in the stem, so that they almost *fit* the urethra. To sound a bladder properly, without giving the patient distress or producing spasm, you require an instrument that lies *loosely* in the urethra, and can therefore move freely in every direction. A thick-stemmed sound gives you no better information than a thinner one; the sensation produced on striking a stone in the bladder being precisely the same to your ears and fingers in both cases.

The stems of the sounds I am in the habit of using do not exceed No. 4, and are much more comfortable to the patient than the older-fashioned instruments. There are two other pieces of information which you should endeavour to obtain; these have reference to the size and composition of the stone, as having an

important bearing in determining the treatment to be adopted.

The difficulties which arise in making a diagnosis as to the presence of a stone in the bladder are for the most part traceable to the existence, as complications, of one of the three following conditions:—

First: the presence of a stricture of the urethra, or an enlarged prostate.

Second: a diverticulum, or recess within the bladder, in which a calculus may be lodged.

Third: the coating over of the stone with an imperfectly organised leather-like substance, which conceals it from detection with the sound.

In all cases of long-standing stricture it is well to bear in mind that the symptoms of stone may be concealed by those of the stricture; this occurred in a case of Mr. Stubb's, to which I have already alluded, where a stone was not suspected or detected until perinæal section had been performed. Under similar circumstances, I crushed with the lithotrite, some time ago, a small calculus, which I only discovered just as I was completing the treatment of a stricture by Holt's operation. I have already drawn attention to the fact, and give an illustration of it (Plate F), that an enlarged prostate may serve to conceal a calculus, unless special care is taken in using the sound to avoid such a source of error.

In reference to difficulties arising from the presence of diverticula, or recesses within the bladder, in which a stone may be concealed, I will refer to an interesting

case narrated by Mr. Hakes, at the Liverpool Medical Institution, during the session of 1863-64.

The patient was an old man, suffering from stone in the bladder, for which lithotrity was performed at the Northern Hospital; unfortunately, the operation terminated fatally. On making a *post-mortem* examination, a diverticulum, larger than the bladder itself, was found, communicating with the floor of the bladder by an opening admitting the little finger. In it was contained a portion of the calculus, broken by the lithotrite. Such a condition as this might not only account for a calculus being undetected, but would impose serious difficulties in the performance of lithotrity. Digital examination by the rectum, after the bladder had been emptied with a catheter, would probably afford the best means of detecting this complication, should any suspicion of its existence arise.

In the last place, the stone may be so constituted as in itself to oppose a difficulty in detecting it by the means usually employed.

In 1863, a boy was admitted into the Liverpool Royal Infirmary, under the care of Mr. Long, suffering from prolapsus ani, purulent urine, and painful and frequent micturition.

The child was sounded carefully, but without any evidence of stone being afforded. Death occurred in the course of a few days. On making a *post-mortem* examination, the kidneys were found in an advanced stage of disorganization. One was extensively sacculated, with its cortical structure nearly gone; the

other was much enlarged and structurally changed. The bladder was small, and in it lay a calculus, made up of a urate of ammonia nucleus, the size of a damson-stone, surrounded by a thick layer of soft material, consisting of mucus, fibrin, and a little gritty matter, probably phosphatic. The outer covering could be cut or torn easily; and, after it had been in spirit, it presented, on section, a laminated appearance, like the fibrinous layers found in an aneurism. On striking the mass with a metal instrument, no ring was produced. Hence the impossibility of determining its existence during life with the sound. The probable explanation is that the irritation produced by the calculus led to the deposition around it of a lowly organized plastic material, similar to the exudation membrane we see in croup and diphtheritic affections. I have seen something similar, but less well marked, in other cases where lithotomy has been performed. The specimen I have described was exhibited before the Liverpool Medical Society by Dr. Rawdon, and is now in the Museum of the School of Medicine. In the accompanying sketch the calculous nucleus, with a section of the fibrinous laminæ, are seen. (Plate G, Fig. 3.)

Mr. Bickersteth records a similar instance. "It was that of a boy, who had every symptom of a stone, but in whom repeated examinations gave no clear indication of its presence. When the sound was introduced, I could feel, with my finger in the rectum, some apparent thickening in the posterior part of the bladder. I operated, and extracted a mass precisely

similar to that just mentioned (Mr. Long's case), and the child recovered."*

In the absence of what is regarded as the only positive sign of the existence of stone in the bladder—namely, its detection by the sound—reliance must be placed on other, though less worthy, evidences; of these, in children (amongst whom only soft calculi have, so far as I know, been found), the presence of prolapse of the rectum, together with signs of urinary irritation, would, in the absence of any other explanation, justify what might be regared as an exploratory operation. The slight risk attached to the operation of lithotomy in children would be justifiable to incur where there were reasonable grounds for suspecting that the symptoms might be due to the presence within the bladder of such a calculus as I have described.

These, then, are illustrations of some of the difficulties which we may have to encounter in determining the existence of a stone in the bladder.

Calculi, or portions of them, occasionally become impacted in the urethra, and in children are the most frequent cause of retention of urine.

There are one or two practical points in reference to their treatment to which I will allude.

In the first place, it is most desirable to avoid opening the penile portion of the urethra, except the meatus, for the purpose of extracting a calculus, should it be so fixed. A wound of the urethra here is often most difficult to heal, and frequently results

* "Observations on Lithotomy."—*Liverpool Medical and Surgical Reports*, vol. i., 1867.

in a permanent fistulous opening. If the stone cannot be extracted by forceps or other suitable instrument, it is better to push it backwards towards the bladder, and with the finger in the rectum to command it, whilst an incision in the perinæum is made, through which it may be withdrawn. Such a wound heals kindly, just as in median lithotomy.

Where a calculus is retained within the meatus—the narrowest portion of the urethra—should there be any difficulty in extracting it, it is advisable to incise the meatus rather than to lacerate it by the exercise of force; such a proceeding is less likely to be followed by a stricture.

When a stone has been removed from the urethra, it is very necessary to explore the bladder with the sound, as others may remain behind and form the nuclei of larger ones.

In a case where I performed lateral lithotomy in a boy, at the Royal Infirmary, my attention was first called to him by having to remove from his urethra a small calculus, which proved on examination to be only a portion of a larger one. On introducing a sound, I detected a stone within the bladder, on the removal of which I found that a small spike of it had become detached, and so found its way into the urethra.

Speaking of spikes on a calculus, this specimen is a remarkable instance of such a formation. (Plate H, Fig. 1.) It is from a patient who was admitted into the Infirmary in a dying state, and in whose bladder I discovered it, having reason to suspect that he was

PLATE H

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suffering from stone. The patient's condition was, in the opinion of my colleagues, in which I entirely concurred, so hopeless as to render any operation inadmissible; death occurred within twenty-four hours of his admission. It will be seen that one of the spikes is broken off; this I believe was occasioned by the sound. The calculus weighs three drachms. In reference to the shape assumed by calculi, I have two specimens to exhibit which in this respect are almost unique.

The first was removed by Dr. Lowndes, from a boy, at the Liverpool Northern Hospital, and weighs one ounce and half a drachm; the anterior portion of the calculus seems to have been cast within the prostatic portion of the urethra, the urine escaping by the side of it. (Plate H, Fig. 2.) The lateral operation was performed, and the patient made an excellent recovery.

The other specimen was successfully removed by Mr. Rushton Parker, at the Stanley Hospital, from a patient who had suffered from symptoms of stone extending over a considerable period of time. Here the calculus appears to have occupied the place of the prostate, only the capsule of the gland remaining; the urine not, as in the previous instance, escaping by the side, but through a channel in the stone, corresponding in direction with the continuance of the urethra.* (Plate H, Fig. 3.) It weighs nine drachms and two scruples.

* *British Medical Journal*, January 19th, 1878.

SIXTEENTH LECTURE.

Treatment of Calculous Disorders — Lithotomy — Lithotrity — Nitric Acid Injections in Combination with Lithotrity — Stone in Females — Mode of Operating.

The treatment of stone in the bladder practically resolves itself into deciding in a given case whether lithotomy or lithotrity shall be resorted to.

There is another method of treatment, by lithontriptics or solvents, which, though it has been the subject of much painstaking enquiry and experiment, particularly by Dr. W. Roberts, has not yet been brought into such a form as to render it practically useful, so far as urinary calculi are concerned, except to a comparatively limited extent, and this chiefly in the treatment of renal deposits, or in combination with lithotrity.

My remarks on lithotomy and lithotrity will be limited to a few practical observations, avoiding anything like systematic descriptions of these operations, inasmuch as they are to be found in surgical textbooks and the many excellent monographs relating to this subject.

I think it will be generally admitted that nothing better illustrates the progress which the science and art of surgery have made within the present century,

and in our own recollection, than the treatment of stone in the bladder; nor would it be profitless or uninteresting, if occasion offered, to trace the successive stages by which this advance has been made. Further than this, lithotomy and lithotrity, by their limitation to the class of cases to which they are respectively appropriate, have undoubtedly effected a considerable saving in human life.

The operation of lithotomy, from whatever standpoint we look at it, must be regarded as one of the most successful, if not the most successful, proceeding of any magnitude we are called upon to execute; in illustration of this, I would mention as an example, that, in the obituary notice of the late Mr. Southam, which appeared in the *Lancet*,* it is stated "he had performed the operation of lithotomy one hundred and twenty times, and had only lost one patient."

There are various modes of performing lithotomy; I shall confine my remarks to that which you usually see practised in this Hospital with so much success, namely, the lateral operation.

In its performance it is of great importance that the first incision should be sufficiently free; much of the difficulty I have occasionally seen in arresting hæmorrhage and extracting the calculus, has arisen from the operator making so limited an incision as not to admit daylight, should such be required, and the necessary manipulations. Where the incision has been free, I have never seen, or experienced myself, difficulty in tying any artery that may have been divided, includ-

* *Lancet*, May 5th, 1876.

ing, undoubtedly, on one or two occasions, the artery of the bulb. In the second place, take care, after entering the groove on the staff, that you do not leave it, and by your manipulations with the finger, thinking that the knife has been sufficiently used, make a space between the rectum and the bladder, which you are so led to believe is the latter.

This is more likely to happen in children, where the bladder is an abdominal rather than a pelvic viscus. Such an error is to be avoided by depressing the handle of the knife as the point is pushed onwards to the bladder. This is well illustrated by Mr. Bickersteth, in his "Observations on Lithotomy," to which reference has already been made.

The deep incision, made along the staff, by which the prostate is incised, should be sufficiently free to permit the entrance of the finger without the exercise of anything like such dilating force as would, by disturbing the connections of the bladder, be likely to do harm. This point has been very forcibly urged in a practical paper, by Mr. Teevan,* on Lithotomy.

The last precaution I would remind you of is, not to withdraw the staff until your index finger is well within the bladder, when, most probably, the stone will be readily discovered.

"If possible, and it almost uniformly is so, the stone should be felt with the finger before any instrument is introduced, or attempt made to seize it."† The staff should not be removed if there is the

* *British and Foreign Med. Chir. Review*, January, 1867.
† *Practical Surgery*, by Robert Liston, p. 413.

slightest doubt whether the bladder has been reached, inasmuch as in difficulty it is your only reliable guide.

It is the practice at this Hospital, after the operation is completed, to introduce a gum-elastic tube along the wound into the bladder, and to retain it for twenty-four hours; this prevents any blocking up by clots, and is, I consider, an advantageous proceeding. Where there is hæmorrhage which cannot be arrested by ligature, a dilatable tampon, such as that described by Mr. G. Buckston Browne,* will be found an efficient substitute for the ordinary tube.

Turning to lithotrity, the conditions favourable to the performance of this operation may be generally summed up as—a middle-aged healthy person, a stone of moderate size and hardness, a normal urethra, and a fairly tolerant bladder. All cases which we submit to lithotrity do not, however, come up to this standard; for instance, in some, the presence of the stone and an unhealthy condition of urine may render the bladder and urethra intolerant of any instrumental interference. Preparatory treatment will often avail much in mitigating such complications so as to bring the case within the scope of lithotrity. There are one or two points to which I will refer.

First, as to anæsthetics. I do not generally use them for lithotrity, inasmuch as I find the operation is not one that taxes much the endurance or fortitude of the patient. I have employed ether, and would not hesitate giving it should a patient require it. Nor do I object to anæsthetics on the grounds that the

* *Lancet*, Sept. 15th, 1877.

operator might unconsciously do some damage which a conscious patient might prevent. Such an objection would apply with about equal force to almost every operation in surgery.

I prefer operating with some urine in the bladder, from four to six ounces, and I therefore instruct patients to retain their urine for some time before a crushing; or, if this cannot be done, I inject the necessary quantity of tepid water.

Next, as to the selection of a lithotrite. None but those who, like myself, have had to operate with the old rack and pinion instrument can fully appreciate—I was going to say—the luxury of using the modern instrument, the joint production of Sir Henry Thompson and Messrs. Weiss.* It combines every element necessary for the most delicate manipulation, and the application of the requisite force.

Further, I would lay stress on carefully studying the proper position for each patient during the performance of the operation. As Sir Henry Thompson points out, there is an "area" in every bladder in which to operate. You want to make that area correspond with the position taken up by the lithotrite as it lies in the bladder. I have often noticed how one pillow more or less placed under the pelvis makes all

* Whether, in the face of the very perfect instrument we at present possess, the lithotrite is capable of being further improved is doubtful. I cannot, however, in justice to Dr. G. C. Duncan, of Montreal, refrain from noticing a most ingenious application of the drill which he has adapted for this purpose. He has kindly shewn his instrument to me and my class; but, inasmuch as it has not yet been submitted to the actual test of experience, I cannot say more. Dr. Duncan is the author of a suggestive article on Litholysis, which appeared in the *Edinburgh Medical Journal*, of May, 1877.

the difference in the facility with which the fragments are caught at successive "sittings."

Do not retain the lithotrite too long in the bladder. If you cannot do all you want to do within three minutes, you had better leave it undone. Though three minutes seem a short space of time—especially when not measured by the watch—yet you will see a surgeon who is accustomed to use the lithotrite, pick up and crush several fragments at a sitting in considerably less time than this. Much of this adroitness is due to the operator having previously carefully considered his bearings, and the best position in which to place the patient, with a view of limiting as far as possible his area of action.

When the stone has been broken up, I am not in the habit of using any apparatus, such as Clover's, for the removal of the detritus. I prefer keeping the patient in bed for a short time after each sitting, and not in any way hastening the discharge of the fragments, until they have been sufficiently pulverized to escape during micturition.

In reference to the cystitis which sometimes follows lithotrity, we meet with it in two forms, viz., as acute and chronic; the former is usually due to traumatic agencies, and is best met by the removal of the cause; that is to say, the further and speedy breaking up of the fragments by the lithotrite, so as to render them less capable of causing irritation.*

* Dr. Bigelow, Professor of Surgery at Harvard University, in a paper entitled "Lithotrity by a Single Operation," advocates the rapid crushing of stone, and records eight cases, with one death, in some of which the "sitting"

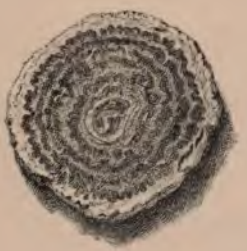
The chronic form of cystitis, indicated by an irritable state of the bladder and unhealthy muco-purulent urine, is generally due to residual urine; watchful care should always be taken after lithotrity to guard against this, and, when discovered, to prevent its ill consequences by catheterism and washing out of the bladder, as described in a previous lecture.

Though, for obvious reasons, lithotrity is best suited to adults, it is not necessarily restricted to these. At one crushing I removed from a boy, eight years of age, a small uric acid calculus, and recently, in two sittings, I completely broke up a similar, though larger calculus, in a young gentleman, aged sixteen years.

Messrs. Weiss' small lithotrite leaves nothing to be desired for this purpose.

It is sometimes remarkable what large fragments may be voided through the urethra after lithotrity. I have figured (Plate I, Fig. 1) some of the pieces which were passed in a case I attended, with Mr. Gaskell, of St. Helens, and where, at seven sittings, I crushed a uric acid calculus, two inches in diameter. The patient was forty-two years of age, and made a good recovery. I need hardly add, he was possessed of a urethra admirably adapted for such an operation. The largest fragment, which you see sketched, weighed precisely twenty grains.

occupied an hour and-a-half. Commenting on his operations, he states, "The cases abundantly illustrate what the operation is able to accomplish in removing at once a large quantity of stone by the urethra, and demonstrates a tolerance of the bladder of protracted manipulation which has not hitherto been recognised." All the cases were soft stones (*i.e.*, not oxalate of lime).—*American Journal of the Medical Sciences*, January, 1878.



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Litholysis, or the dissolving of fragments of calculi, may sometimes be advantageously combined with lithotrity.

The solvent action of nitric acid upon the *débris* of a phosphatic calculus was well illustrated in the following case, which in many respects is similar to one recorded by the late Mr. Southam, of Manchester, and alluded to by Dr. W. Roberts in his Observations on the Solvent Treatment of Phosphatic Calculi. *

William C., a police officer, æt. 45, was admitted into the Liverpool Royal Infirmary, under my care, on March 9th, 1875. The patient had recently been under the observation of my friend Dr. J. S. Clarke, who, having diagnosed the existence of a stone in the bladder, advised his admission into the Infirmary.

Upon examination, I found a single stone, rounded and having a diameter of two inches and a quarter. The urine was alkaline, and contained pus. Though the stone was large, I deemed the case not unfavourable for lithotrity. The patient required some preparatory treatment, and I was not able to commence lithotrity till April 5th. I repeated the crushings during April and May twelve times.

The patient never experienced any unfavourable symptom, and a very considerable quantity of broken-up stone was passed. As in Mr. Southam's case, to which I have alluded, it appeared to me that fresh phosphatic depositions were taking place almost as fast as the others were removed. I resolved, therefore, to use nitric acid injections.

On May 27th (two days after a crushing), I had the urine of twenty-four hours' collected. This was analysed by Dr. J. Campbell Brown, who gave me the following report. The quantity of urine submitted to analysis was sixty ounces; this was found to contain 74.029 grains of phosphoric acid as

* *On Urinary and Renal Diseases*, by Dr. W. Roberts, 2nd Edition.

alkaline earthy phosphates; 250.516 grains of phosphoric acid as alkaline phosphates; in all, 324.545 grains of phosphoric acid passed in twenty-four hours. On the termination of this twenty-four hours, I injected into the bladder half a pint of tepid water, with two drachms of diluted nitric acid.

All the urine passed during the subsequent twenty-four hours was kept and analysed by Dr. Brown, with the following result. The quantity of urine submitted to analysis was seventy-eight ounces; this was found to contain 96.237 grains of phosphoric acid as alkaline earthy phosphates; 461.94 grains of phosphoric acid as alkaline phosphates; total, 558.177 grains of phosphoric acid passed in twenty-four hours.

Thus it appears that not only was a larger quantity of phosphate of lime and magnesia dissolved in the urine after treatment with nitric acid, but there was a still greater increase in the quantity of phosphoric acid passed in the form of alkaline phosphates. It is to be noticed that the quantity of urine on the day after treatment was greater than on the day before; and that, if, instead of estimating the total phosphates, we estimate the percentage of phosphates in the urine, we find that the percentage of alkaline earthy phosphates was very nearly the same after as before treatment, namely, increased from 0.272 to 0.282, and that the percentage of alkaline phosphates was increased from 0.95 to 1.35. But the absolute increase of phosphates is much more marked.

On nine subsequent occasions the lithotrite was employed, and, on every second or third day afterwards, the bladder was injected as before with nitric acid in tepid water. Further observations, though made in a rougher manner, shewed the increase of the alkaline phosphates after each injection; it was also noticed that the fragments passed were much more finely triturated than previously.

Under this treatment the patient made a good recovery, and left the Infirmary quite well on June 21st. The total quantity

of broken-up stone collected weighed four drachms. The use of the acid appeared to me to stop any further deposition of phosphates, and to facilitate the removal of the pieces as they were broken up by the lithotrite.

Dr. Roberts concludes his observations on Mr. Southam's case with the remark: "This method is evidently capable of wider application than is now made of it by surgeons." *

Stone in females is not of such frequent occurrence as in the opposite sex; a circumstance which is probably due to the shortness of the urethra favouring the escape of a calculus at its earliest formation.

For the treatment of stone in females, rapid dilatation of the urethra and extraction is usually employed in small calculi. When large, they should first be broken up by the lithotrite, and then removed piecemeal.

I was much disappointed in the case of a child, six years of age, upon whom I operated at the Infirmary in 1876, to find that after she left, apparently well, incontinence returned. In this case, the patient being placed under ether, dilatation was readily accomplished by means of Otis's dilator for stricture of the male urethra, which answered the purpose exceedingly well. The stone was almost round, and was hardly an inch in its broadest diameter. (Plate I, Fig. 2.) On a future occasion, in stones of this size in female children, though I do not think I exceeded the limits which some authors give, I shall certainly first use

* *Op. cit.*, p. 313.

the lithotrite, rather than run the risk of incurring so unpleasant a consequence.

The female urethra occasionally is made the resting-place for a stone. A few months ago, I assisted my friend Dr. Lyster to remove a large calculus lodged in a sulcus in the floor of the canal. The stone was of an oval shape, measuring one-and-a-half inches in length and three-fourths of an inch in breadth, and was chiefly composed of uric acid. (Plate I, Fig. 3.) Removal was effected by rapidly dilating the urethra with Weiss' instrument, and then extracting. The patient recovered without any bad symptoms.

SEVENTEENTH LECTURE.

TUMOURS OF THE BLADDER AND PROSTATE — SCIRRHUS — MEDULLARY — NON-MALIGNANT TUMOURS — VILLOUS GROWTHS — PALPATION BY THE RECTUM.

CLINICALLY, tumours of the bladder and prostate, like those affecting other parts, are divisible into two groups, namely, simple and malignant; the former capable of existing for a considerable period of time without serious ill-consequences, so long as by their presence they do not seriously interfere with the functions of the bladder; whilst the latter present all the well-known destructive features of cancerous growths.

First: in reference to cases and specimens illustrative of malignant tumours.

In the *Lancet*, of April 28th, 1877, an interesting case, of what is generally admitted to be a rare disease, namely, scirrhus of the prostate, is recorded as having been in the wards of Dr. Dickinson, at the Liverpool Northern Hospital. The following is from the notes of Dr. Craigmile, the House Physician.

"G. B——, forty-seven years of age, a sailor, was admitted into the medical wards on Oct. 20th, 1876, suffering from chronic rheumatism. The pains in the joints soon passed off, but as he remained very weak, a more careful examination was made, and he then stated for the first time that he had pain and

difficulty in passing water. He had had gonorrhœa a year before, followed by stricture, for which he had been treated by instruments. The perinæum was hard and cartilaginous, and there were two fistulous openings there. The glands in both groins were considerably enlarged, especially on the left side, and all were of a stony hardness. On examination per rectum, a hardened mass was felt, corresponding in size and shape to an enlarged prostate, and so hard as at once to suggest scirrhus, especially when associated with such glands. No cathether could be introduced beyond the stricture, but as morphia suppositories were found to give him ease in making water and freedom from pain, no further attempt to cure the stricture was made. The other signs were those of persistent cystitis, and occasionally he passed blood. He got gradually weaker, and the cancerous cachexia became more marked. He died on the 12th January, 1877.

The *post-mortem* appearances were the following:—The tissues at the base and sides of the bladder were all matted together and thickened. The prostate was about the size of a horse-chestnut, and when cut into had all the appearance of scirrhus. There were three glands lying along the right iliac vessels much enlarged and hardened. The bladder showed well-marked signs of cystitis, both ureters were greatly dilated and thickened, and the kidneys were undergoing atrophy from the backward pressure of the urine; but all these changes seem to have been due to the stricture rather than to the disease of the prostate, since the prostatic portion of the urethra was of normal size, and the tumour did not seem to obstruct the outflow of urine. There was no appearance of cancer elsewhere, nor any other noteworthy change in any of the organs. Microscopic examination showed great dilatation of the tubes of the gland, with large collections of cells in them, as in ordinary glandular carcinoma, but there was exceedingly little infiltration of the muscular stroma, which seems to be characteristic; for

Rindfleisch, quoting another authority, says it is confined to the glandular elements, and that the stroma remains passive. The enlarged glands were also cancerous when examined. The kidneys both showed well-marked interstitial nephritis."

I have introduced this case as illustrative of the features which led to the discovery of the disease during life, and its identification after death by microscopical examination.

The case presented the usual indications of scirrhus, as observed in other parts of the body, viz., extreme hardness of the prostate, enlargement of the adjacent glands, and a marked "cachexia," such as is observed in cancerous disorders; in addition, we have, as incidental to all growths within the bladder, occasional hæmorrhage and signs of cystitis.

Passing to an illustration of another variety of cancer, viz., the soft or encephaloid, I am able to give you a well-marked example of this which came under my own observation, under circumstances where it was found necessary to relieve the most urgent symptom, and empty the bladder by means of the aspirator.

In January, 1874, I saw, with Dr. W. Little, a youth, aged nineteen, suffering from retention of urine. I was furnished with the following particulars: — For four weeks previously he had experienced difficulty in passing water, consequent on an attack of gonorrhœa, from which he was suffering early in December. Previous to the gonorrhœa he was in every respect in good health. On the 30th of December the difficulty in urinating was so great that he applied to a surgeon, who found it necessary to relieve him by catheterism. From this date similar treatment under different hands had frequently to be resorted to.

On the 28th of January, he came under the notice of Dr. Little, suffering from extreme retention of urine; and, as the case presented certain peculiarities, I was requested to visit in consultation. This I did on the following day. On examination, I found the bladder unusually prominent, and apparently largely distended. The perinæum was also much distended, and on introducing the finger into the rectum, a similar condition was discovered. The prominent or bulging perinæum was unlike an abscess, as the swelling was elastic and of uniform consistence. The skin was neither inflamed nor discoloured, and there was no indication that extravasation had occurred. On introducing a full-sized catheter, no obstacle could be felt; the instrument appeared to take a natural course, but no urine escaped. On removing the catheter, the apertures were found blocked with a brain-like looking substance.

As urine had not been passed for some hours, it was quite clear that the catheter had failed to reach the bladder. As retention was the prominent symptom, it was equally clear that this must be relieved at once. The catheter failing, it was agreed to puncture what appeared to be an enormously distended bladder above the pubes. This was accordingly done with the small needle of the pneumatic aspirator, when about three pints of dark urine were removed. This relieved the patient entirely, and the abdominal prominence subsided. Not so, however, with the perinæum; which remained as bulging and as tense as before.

The state of the perinæum being evidently the cause of the retention, a free incision was made in the central raphé. This gave exit to a mass of brain-like looking matter, mixed with clots in various stages of disintegration. The mass which escaped spontaneously, or was scooped out by the fingers, was sufficient to fill a pint vessel. The hæmorrhage was general and copious, rendering it necessary to plug the wound, and apply pressure by a T-bandage. By this treatment the urgent

symptoms were all relieved, and subsequently urine passed through the penis and perinæal incision. The puncture made by the aspirator occasioned no inconvenience, and disappeared in the course of a few hours. On January 31st a large sloughy mass came away through the perinæal wound, and a smaller one on the 5th of February. On the 4th of February symptoms of exhaustion set in, and from that date the patient gradually sank, dying on the 8th of February.

A partial examination of the parts after death showed the bladder to contain a considerable quantity of the cerebriform-looking mass. It is to be regretted that a complete examination of the body was not made, as the precise origin of the growth was consequently not satisfactorily determined. The nature of the growth was undoubtedly encephaloid cancer, presenting the usual characteristics of this disease.

The aspirator at once relieved the prominent symptom—namely, retention of urine, and, further than this, it was the principal means of arriving at a diagnosis as to the cause producing it, which at the first aspect was certainly obscure. The extremely rapid growth of the tumour is worthy of notice, the duration of the disorder, from the history of the case, occupying only a few weeks. Whether the growth originated in the prostate, or within the bladder, cannot, in the absence of a more complete examination, be definitely determined; but as the prominent symptom throughout was difficulty in passing urine, it may be inferred that the gland was the part primarily affected.

The class of cases—namely, malignant growths—of which the two I have recorded afford well-marked examples, unfortunately, is not within the range of cure, though much may be done in remedying the distressing symptoms which are usually met with; such means are, however, limited to mitigating pain,

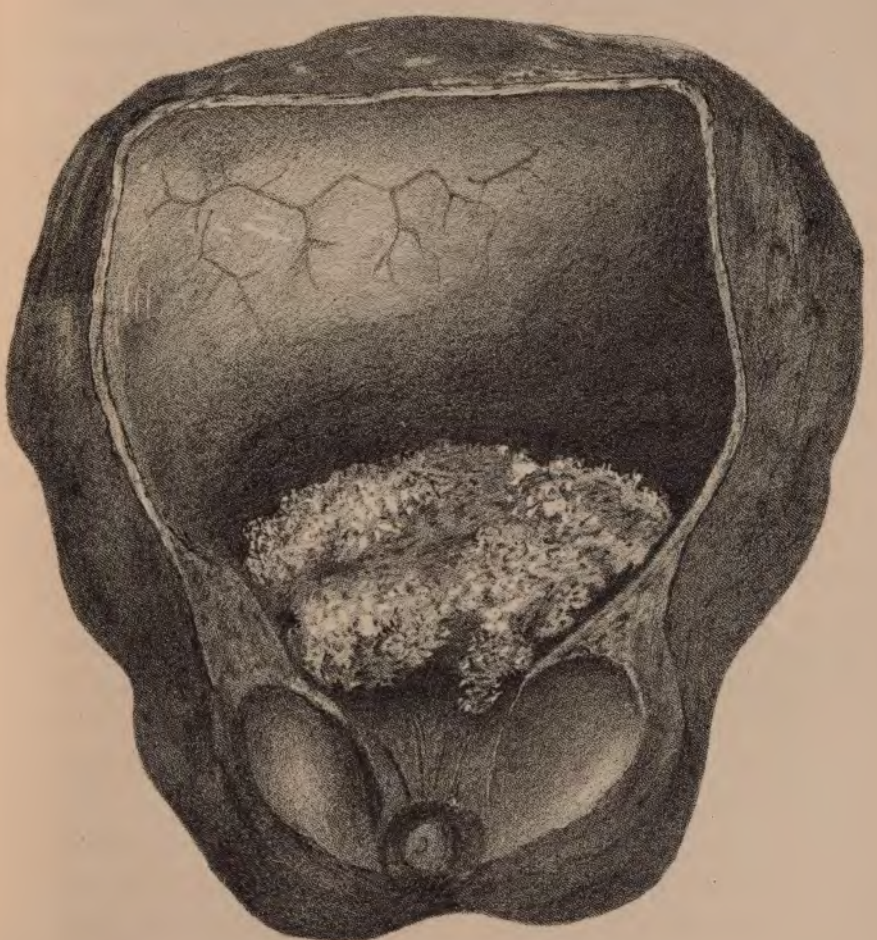
arresting hæmorrhage, and overcoming any obstacle to micturition which may arise in the progress of the disease.

These means have already been considered in connection with other conditions of the bladder, attended with similar symptoms, though produced by other causes.

Amongst non-malignant tumours of the bladder are included those flocculent excrescences not unfrequently met with which have received the name of villous growths. Of these we have several specimens, one of which is represented in the accompanying drawing. (Plate J.) These growths, so long as they do not give rise to hæmorrhage, or obstruct the orifice of the urethra, may exist for a considerable time without causing much inconvenience. Occasionally, by the irritation they give rise to, they simulate stone. I saw a case some years ago, where the weight of suspicion that there was a calculus was increased by a peculiar gritty sensation being felt as the sound was moved about the bladder; this, I believe, was explainable by the villi being encrusted with phosphates, as I have endeavoured to shew in the Plate, where a similar condition existed.

As these growths are of such a flocculent nature, their presence during life cannot with certainty be ascertained, either by digital examination or by the introduction of the sound; the persistence of hæmorrhage in the urine, aggravated by the passage of instruments into the bladder, together with the evidence which "the process of exclusion" affords, will point to the

PLATE J



probable cause. Unmistakable proof, however, is not unfrequently afforded by microscopical examination of the clots and broken tissue which either spontaneously escape, or are entangled in the eye of a catheter that may have been introduced. Such occurred in the specimen (Plate J) removed from a patient of Mr. Long's, where, during life, the nature of the growth was in this way discovered. Again, in a case of Dr. Davidson's, at the Northern Hospital, where the patient was admitted for severe hæmaturia, the existence of a villous growth, as the probable cause, was determined in a similar manner. The microscopical appearance of these growths is well shewn in the *Transactions of the Pathological Society of London.**

In the treatment of villous growths, it must be remembered that when they prove fatal, it is by the severe hæmorrhage they occasion; consequently it is very desirable to avoid lacerating them by any unnecessary introduction of instruments into the bladder. It must not be lost sight of that these excrescences belong to a class of tumours which in their nature do not offer any obstacle to removal; they do not shew any tendency to ulcerate—to involve structures other than the mucous membrane—to implicate glands—or to invade the system generally; where they prove fatal, it is by hæmorrhage, which might, there is reason to believe, by mechanical means, be as capable of restraint as that which an open nævus would give rise to. Cases are recorded where such growths have been successfully removed.

* Vol. xxi., p. 239.

Erichsen* alludes to an instance where Billroth removed such a tumour from the bladder of a boy, by performing supra-pubic and median cystotomy at the same time, and guiding a knife passed in through the perinæal wound, with the finger inserted at the supra-pubic opening. The case terminated favourably. Dr. W. Alexander, Surgeon to the Liverpool Parish Infirmary, has kindly favoured me with the notes of a case where he also operated successfully for the removal of a similar growth.

The patient was a female, 35 years of age, who appears to have suffered from a growth within the bladder for several years, the symptoms of which were aggravated from time to time by attacks of cystitis.

By the introduction of the finger into the bladder, Dr. Alexander was enabled to feel the villous excrescences, some of which were coated over with phosphatic deposit. The patient being placed under chloroform, and the urethra dilated by means of an anal speculum, the wire of an écraseur was passed round the base of the largest growth, which, in this way, was removed. Some smaller excrescences were also detached by means of the finger, after which the bladder was washed out with a weak solution of perchloride of iron. There was a fair amount of hæmorrhage during the operation, and the urine contained a good deal of blood for the first week. The patient suffered but little constitutional disturbance, and incontinence of urine only remained for two days. After an interval, during which she remained in good health, a recurrence of her symptoms took place, when it was found that further growths existed; these were removed by the finger fifteen months after the first operation, since which date (October 5th, 1877,) she has remained free from all symptoms of urinary disorder.

* *Science and Art of Surgery*, 7th Edition, vol. ii., p. 849.

The appearance presented by these growths, as well as their microscopic characters, corresponded with those of the villous tumours to which allusion has already been made.*

Tumours presenting some of the appearances of these villous growths, but of a malignant nature, occasionally are met with. A specimen illustrative of this was recently exhibited at the Liverpool Medical Institution, by Dr. Cameron. The patient was admitted into the Royal Southern Hospital, in a very exhausted condition, suffering from hæmaturia, extending over three weeks. On examining the bladder after death, numerous excrescences, very similar to the true villous growth, were seen about the floor of the bladder. The portion of the bladder from which these sprung was thickened and indurated, the induration extending to the adjoining portion of the rectum. Several glandular enlargements were found between the bladder and the bowel.

Cases such as these have probably led some authors to regard villous growths as malignant; by their induration, their tendency to spread and involve other organs, such as the rectum, and to implicate glands, they present features which the true villous growth is not found to possess. Still, however, their occasional resemblance to them in one particular, and that, perhaps, the most striking, must not be passed by unnoticed.

It should not be forgotten, in speaking of the diagnosis of tumours of the bladder, that it is possible

* A further reference to the removal of villous growths from the bladder will be found in the *British and Foreign Medico-Chirurgical Review*, vol. lviii., p. 280.

to introduce the hand into the rectum, and so to explore the contents of the pelvis.

I have never had occasion to practice this, and for a description of the parts, as felt in this way, I will refer to the article on Palpation by the Rectum, by Mr. Walsham.* "Through the anterior wall (of the rectum) the hand first recognises the prostate, which feels like a moderately large chestnut. Immediately behind the prostate, the vesiculæ seminales may be distinguished as two softish masses, situated one on either side of the middle line. Internal to them the whip-cord-like feel of the vasa deferentia can be readily traced over the bladder to the sides of the pelvis. The bladder is easily recognised, when moderately distended, as a soft fluctuating tumour behind the prostate; when empty, it cannot be distinguished from the intestines, which then descend between the rectum and the pubes. The arch of the pubes can well be defined when the bladder is empty."

This article further says:—"Dr. G. Simon, in a paper in the *Archiv für Clinische Chirurgie*,† states that repeated dilatation of the anus to its maximum does not destroy its contractile power, and that in no instance has permanent incontinence of fæces been the result."

This mode of examination having been recently introduced into practice, I have thought it necessary to bring it under your notice, as bearing upon the subject of the digital examination of the bladder, though at present I have no experience of my own to offer in reference to it.

* *Landmarks, Medical and Surgical*, by Luther Holden, p. 70. 2nd Edition.

† Vol. xv., p. 1. 1872.

EIGHTEENTH LECTURE.

ULCERATIONS OF THE BLADDER — SURFACE ULCERATIONS — PERFORATING ULCERATIONS — COLOTOMY — SLOUGHING OF THE BLADDER.

ULCERATIONS involving the bladder primarily, or by an extension of disease from surrounding organs, though not of frequent occurrence, will be most conveniently considered under a separate heading, inasmuch as they require very different treatment to that which would be appropriate to the various growths from which they may originate.

I will group them into two classes, namely, (1) surface ulcerations, where the lesion does not extend beyond the structures proper to the bladder; and, (2) perforating ulcers, where a communication is established between the rectum or other of the pelvic viscera.

In the first group, we have traumatic, tubercular, and malignant ulcers. In the second, malignant and non-malignant perforations.

Traumatic ulcerations may be caused by catheters retained in the bladder for retention of urine, and by the passage of foreign bodies, such as pieces of bone, which have been known to make their way through the coats of the bladder. Some years ago I made a *post-mortem* examination in the case of a sailor, who was admitted into the Northern Hospital, where a silver

catheter had been worn in the bladder for ten days previously. The instrument was a small one, and had been introduced by the captain of his ship with difficulty. The weather was exceedingly rough, and the patient suffered considerably, though he dare not remove the catheter, for fear of it being found impossible to re-introduce it. He died shortly after his admission. The urine passed during the short time he was in the hospital was loaded with blood. At the autopsy a deep ulcer, corresponding with the end of the instrument, was found in the roof of the bladder, which no doubt was the cause of the hæmorrhage which led to his death.

In retaining and securing instruments in the bladder, we should remember that it is sufficient to have the opening in the catheter just within the orifice, not only to avoid the infliction of such an injury as I have illustrated, but also to minimise the risk of giving rise to cystitis.

I have already alluded to a case of my own, where a piece of bone, by ulcerating through the walls of the bladder, had formed the nucleus for a calculus.

A very unusual instance of the passage of a foreign body into the bladder from the intestines by ulceration, is recorded by Mr. Alfred Roberts, of the Sydney Hospital, New South Wales.*

Here the patient, aged 47 years, had swallowed a piece of slate-pencil, two and a quarter inches long, which was subsequently successfully removed from the bladder by lithotomy. Commenting on this remarkable

* *Medical Times and Gazette*, July 30th, 1859.

case, the author says:—"I have left no stone unturned to elucidate the truth in this very interesting case, and can only state that, after much hesitation, I have arrived at the conclusion that the pencil was swallowed by mouth, and made its way by inflammation and ulceration into the bladder."

Such, then, are a few illustrations of traumatic ulceration of the bladder.

In children, tubercular ulcerations of the bladder are met with presenting symptoms not unlike those caused by calculus.

A case of this kind was not long ago under my care in the Infirmary. The child was strumous; there was frequent micturition, which was followed by relief; the urine contained blood and pus in small quantities. On sounding, the bladder was found to be rough, and the quantity of blood was increased on each occasion the instrument was used. The patient was treated with cod-liver oil, steel, tonics, and milk diet, and eventually completely recovered.

The late Mr. Fletcher shewed me a bladder, removed from a child, containing several tubercular deposits, one of which had passed into a ragged ulceration. The features of the case were very similar to those I have just mentioned. In the absence of any indication of co-existing tubercular disease of the kidneys, where the symptoms resisted other means of treatment, it would be proper to place the bladder at rest for some time, by allowing the urine to escape spontaneously through an incision similar to that employed in lateral lithotomy. Such a proceeding has

been followed by success, and may, in children, who are almost invariably the subjects of such ulcerations, be practised with but little risk.

Like other malignant growths, those affecting the bladder may end in ulceration. When this stage is reached, the loss by hæmorrhage, added to the distress which such a condition invariably gives rise to, soon terminates in death. The nature of the ulceration can generally be determined by the presence of one or other of the signs of malignancy, in addition to those indicating ulceration, which have already been referred to in my remarks on malignant tumours of the bladder.

In the second group we have two varieties of perforating ulcers, namely, the non-malignant and the malignant. Amongst the former we include ulcers which, though not cancerous in their nature, are exceedingly destructive, often not revealing themselves until in their progress they have involved other organs or spaces. Of these, some are remediable, whilst others are beyond the reach of surgical aid, assuming we were able to diagnose the course they were taking.

Belonging to the latter, is the very interesting case recorded by Mr. Bartleet, of Birmingham, where a perforating ulcer of the bladder made its way into the ileum, and caused death, as it were accidentally, by setting up peritonitis.* The ulcer, whilst confined to the bladder, as Mr. Bartleet remarks, appears to have gone through all its stages without presenting any symptoms, and whilst the patient continued to follow his accustomed occupation. A sudden lifting move-

* *Lancet*, February 5th, 1876.

ment, which occasioned acute pain, most probably broke down the recent adhesion between the bladder and bowel, and led to the extravasation of urine, which was the cause of death.

Of the remediable perforations, we must include cases such as that narrated by Mr. Hakes, for which colotomy was performed with complete success. In addition to the valuable records of this case,* which, in some respects, may be regarded as unique, I had the advantage of watching, with much interest, the patient throughout.

Briefly to summarise: the man was admitted into the Infirmary in a very deplorable condition, consequent on an ulceration between the bladder and rectum, which had existed for twelve months previously.

To remedy this, Mr. Hakes performed colotomy in the left lumbar space; the patient made an excellent recovery, and, for about three years, he enjoyed good health, acting as an omnibus conductor, and suffering very little inconvenience from his artificial anus.

Later on he fell into ill-health, and died from uræmia, consequent on extensive degeneration of the kidneys. At a *post-mortem* examination, it was found that not only had the ulcer in the bladder soundly healed, but that the portion of the bowel below the artificial opening had become completely atrophied, being represented by a fibro-areolar cord, in which no trace of a canal could be found.

Such is a brief outline of this very instructive case, which shews how successfully colotomy may be resorted

* *Liverpool Medical and Surgical Reports*, vol. iii.—*Liverpool and Manchester Medical and Surgical Reports*, 1875.

to in non-malignant perforations of the bowel. It illustrates what rest may do, not only for the relief, but for the cure, of disease.

Though colotomy cannot be performed for malignant perforations with the hope of obtaining a permanent cure, it is often to be recommended as a safe means of arresting pain and prolonging life. It proved so in the following case, which has recently been in my wards, and which most of you have had an opportunity of watching.

J. R., æt. 53, was admitted into No. 1 ward on October 9th, 1877, suffering from a recto-vesical fistula of a malignant nature. The disease appeared to have commenced in the rectum ten months previously. On his admission the patient was in a very miserable and reduced condition. Within the rectum was a scirrhus ulceration, which communicated with the bladder by means of an opening, through which a large-sized bougie could be passed. On introducing a catheter into the bladder there was first an escape of most fœtid flatus, followed by urine containing fæces in considerable quantity. The patient was suffering very severe pain, much of which was due to the frequent distension of the bladder with flatus. Frequent washing out of the bladder and rectum, together with anodyne applications, failed to give any permanent relief.

After a consultation with my colleagues, I opened the colon in the left lumbar region, and established an artificial anus. The relief that followed the operation was most marked, all the more distressing symptoms at once disappearing. For some time the patient improved; the disease, however, being evidently very extensive, death took place from exhaustion on Dec. 1, 1877.

At a *post-mortem* examination, extensive ulceration of the rectum and bladder was found, the communication between the two cavities admitting the passage of a finger. The disease was

of a scirrhus nature, and had probably originated within the rectum. I can only add, that the operation entirely fulfilled my expectations—that is to say, it prolonged life and mitigated pain.

In concluding my observations on ulcerations of the bladder, I will briefly allude to those destructive changes which are sometimes observed following upon diseases of the spinal cord, and injuries attended with paraplegia. I do not refer to the damage which is occasioned by retained ammoniacal urine, and the necessary introduction of catheters, which are incidental to all cases of retention; though these may in a measure contribute to bring about morbid changes in the coats of the bladder, yet they are not sufficient to explain that rapid disorganisation of the viscus which is occasionally seen under the circumstances I have indicated. Such a condition is illustrated in the following case, a patient under the care of Dr. Glynn, in the Royal Infirmary, whom I saw for the purpose of making an examination of his bladder.

T. R., æt. 21, a porter, had, previous to his present illness, enjoyed good health. There was no history of syphilis. Two days before his admission to the Infirmary, when at work, he was seized with pain in the bowels. He walked home, took a dose of castor-oil, and applied a mustard poultice to the abdomen. In the night he tried to get up, and found that one leg was useless and numb. In the morning both legs were numb and absolutely powerless, and he was unable to pass his water. When brought to the hospital it was found that there was complete loss of power and sensation in the lower extremities. The urine had to be drawn off, and was found to contain pus and mucus. It was alkaline, and in the course of two or three days large quantities of blood were found mixed with it. Extensive

sloughing of the bladder followed, and for some time before death all the urine was passed by the rectum.

On *post-mortem* examination the spinal cord in the lower dorsal region was found softened. On section, the distinction between grey and white matter was ill-defined. Under the microscope the large cells in the grey matter were much altered in shape, and dilated vessels and leucocytes were observed in large numbers.

The coats of the bladder had sloughed, and abscesses had formed around it, through one of which a communication was established with the rectum.

Cases similar to this, where sloughing of the bladder has taken place, will be found recorded by various authors.*

Such destructive changes as these are probably dependent, as Charcot suggests, upon irritation of certain parts of the spinal cord, and more particularly the grey matter.†

* *A Treatise on Injuries and Diseases of the Spine.* By R. A. Stafford. 1832.

† "How are we to understand so rapid a development of the inflammatory lesions of the urinary passages, after acute affections, spontaneous or traumatic, of the spinal cord? Manifestly, the paralytic retention of the urine cannot here be pleaded, at least, not as the sole, nor even as the predominant, pathological element. Neither is it possible to attach great weight to the opinion (*Traube, Munk.* '*Berliner klin. Wochensch.*', p. 19, 1864,) which would attribute the urine-changes, in such circumstances, to the introduction of unclean catheters, carrying vibriones. In point of fact, the introduction of vibriones into the bladder could only be a chance occurrence, whilst the appearance of ammoniacal, sanguineous, and purulent urine, in the course of acute myelitis, is, like the production of eschars, what may be termed a regular fact."

"The notorious insufficiency of the pathogenic conditions just enumerated renders it at least highly probable that there is a direct action of the nervous system engaged in the production of the affection of the urinary passages which we are considering. The cause of the affection, as of the other trophic lesions which often show themselves at the same time, would therefore be the irritation of certain portions of the spinal centre, and more particularly, no doubt, of the grey substance."—*Diseases of the Nervous System.* By J. M. Charcot. New Sydenham Society. 1877.

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